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ORIGINAL ARTICLES.

THE CORONER SYSTEM IN THE UNITED STATES.

Read in the Section of State Medicine, at the Forty-second Annual Meeting of the American Medical Association, held at Washington, D. C., May, 1891.

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I am aware that the great body of the medical profession have regarded the coroner and his duties as a subject bearing only an indirect relation to the practice of medicine. It was not until 1877, when the coroner laws were pretty thoroughly investigated in Massachusetts, that I believed they demanded revision.

The investigation of the law as practiced in Massachusetts showed clearly that it was not adapted to the best ends of justice; that the coroner, no matter how skilled in any branch of special training, could, under the law, scarcely be expected to discharge his duties in a satisfactory manner. In other words, that the primal fault lay, not so much in the functionary as in the class of duties he was expected to fulfill. The analysis of these duties showed that the same person was expected to be competent as a medical expert, to serve as an administrator of the law, as a judge to hear evidence, to decide upon its admissibility, he being also a witness in the case. Upon his own authority, or assisted by a physician, he was first to determine in a case under investigation if death had occurred by natural means or by violence; that is, by the evil intent of another. It having been decided that further investigation was necessary, a jury was summoned, and testimony was taken, usually in open session. To this he added his own testimony.

From this brief review it will be clearly observed that the office demanded two entirely distinct classes of functions to be discharged by one and the same person. These duties were both legal and scientific, and each in turn might involve questions of the greatest magnitude, often requiring the highest skill and experience in two great branches of learning. A further investigation showed that in matter of fact the office was generally regarded as political, and that the appointees were more commonly men versed neither in law or medicine, and, as a consequence, were necessarily unfitted for the proper discharge of either of the main subdivisions of their duties. This was brought so clearly to the notice of the proper authorities that the manifest unfitness of the law for the complex requirements of modern life was plainly apparent, and Massachusetts abolished her entire system of coroner laws, and established in their place provision for medical examinations and inquest in cases of death and violence. This reformation was accomplished under the leadership of Mr. Theodore H. Tyndale, a member of the Boston bar, with the active coöperation of several distinguished members of our own profession, aided by the State Medical Society, and the law which is here given in full was adopted by the Legislature of Massachusetts in May, 1877:

AN ACT to Abolish the Office of Coroner, and to Provide for Medical Examinations and Inquest in Cases of Death by Violence.

Be it enacted by the Senate and House of Representatives in General Court assembled, and by the authority of the same as follows:

SECTION 1. The offices of coroner and special coroner are hereby abolished.

SEC. 2. The Governor shall nominate, and by and with advice and consent of the council shall appoint, in the county of Suffolk, not exceeding two, and in each county not exceeding the number to be designated by the county commissioners as hereinafter provided, able and discreet men, learned in the science of medicine, to be medical examiners; and every such nomination shall be made at least seven days prior to such appointment.

SEC. 3. In the county of Suffolk, each medical examiner shall receive in full for all services performed by him an annual salary of three thousand dollars, to be paid quarterly from the treasury of said county; and in other counties they shall receive for a view without an autopsy, four dollars; for a view and autopsy, thirty dollars, and travel at the rate of five cents per mile to and from the place of the view.

SEC. 4. Medical examiners shall hold their offices for the term of seven years from the time of appointment, but shall be liable to removal from office at any time by the Governor and council for cause shown.

SEC. 5. Each medical examiner, before entering upon the duties of his office, shall be sworn and give bond, with sureties, in the sum of five hundred dollars, to the treasurer of the county, conditioned for the faithful performance of the duties of his office. If a medical examiner neglects or refuses to give bond as herein required, for the period of thirty days after his appointment, the

same shall be void, and another shall be made instead thereof.

SEC. 6. The county commissioners in each county shall, as soon as may be after the passage of this act, divide their several counties into suitable districts for the appointment of one medical examiner in each district under this act; and when such division is made, shall at once certify their action to the secretary of the Commonwealth, who shall lay such certificate before the Governor and council. But nothing herein shall prevent any medical examiner from acting as such in any part of his county.

SEC. 7. Medical examiners shall make examinations as hereinafter provided, upon the view of the dead bodies of such persons only as are supposed to have come to their death by violence.

SEC. 8. Whenever a medical examiner has notice that there has been found, or is lying within his county, the dead body of a person who is supposed to have come to his death by violence, he shall forthwith repair to the place where such body lies and take charge of the same; and if, on view thereof, and personal inquiry into the cause and manner of the death, he deems a further examination necessary, he shall, upon being thereto authorized in writing by the district attorney, mayor, or selectmen of the district, city or town where such body lies, in the presence of two or more discreet persons, whose attendance he may compel by subpœna, if necessary, make an autopsy, and then and there carefully reduce or cause to be reduced to writing every fact and circumstance tending to show the condition of the body, and the cause and manner of death, together with the names and addresses of said witnesses, which record he shall subscribe. Before making such autopsy, he shall call the attention of said witnesses to the position and appearance of the body.

SEC. 9. If, upon such view, personal inquiry or autopsy, he shall be of opinion that the death was caused by violence, he shall at once notify the district attorney and a justice of the district, police or municipal court for the district or city in which the body lies, or a trial justice, and shall file a duly attested copy of the record of his autopsy in such court, or with such justice, and a like copy with such district attorney; and shall in all cases certify to the clerk or registrar having the custody of the records of births, marriages and deaths in the city or town in which the person deceased came to his death, the name and residence of the person deceased, if known, or a description of his person as full as may be for identification, when the name and residence cannot be ascertained, together with the cause and manner in and by which the person deceased came to his death.

SEC. 10. The court or trial justice shall thereupon hold an inquest, which may be private, in which case any or all persons other than those required to be present by the provisions of this chapter may be excluded from the place where the same is held; and said court or trial justice may also direct the witnesses to be kept separate, so that they cannot converse with each other until they have been examined. The district attorney, or some person designated by him, may attend the inquest, and may examine all witnesses. An inquest shall be held in all cases of death by accident upon any railroad, and the district attorney or the attorney-general may direct an inquest to be held in the case of any other casualty from which the death of any person results, if, in his opinion, such inquest is necessary or expedient.

SEC. 11. The justice or district attorney may issue subpœnas for witnesses, returnable before such court or trial justice. The persons served with such process shall be allowed the same fees, and their attendance may be enforced in the same manner, and they shall be subject to the same penalties as if served with a subpœna in behalf of the Commonwealth in a criminal prosecution pending in said court or before said trial justice.

SEC. 12. The presiding justice or trial justice shall, after hearing the testimony, draw up and sign a report in which he shall find and certify when, where, and by what means the person deceased came to his death, his name, if known, and all material circumstances attending his death; and if it appears that his death resulted wholly or in part from the unlawful act of any other person, he shall further state, if known to him, the name of such person, and of any person whose unlawful act contributed to such death, which report he shall file with the records of the superior court in the county wherein the inquest is held,

SEC. 13. If the justice finds that murder, manslaughter, or an assault has been committed, he may bind over, as in criminal prosecutions, such witnesses as he deems necessary, or as the district attorney may designate, to appear and testify at the court in which an indictment for such offense may be found or presented.

SEC. 14. If a person charged by the report with the commission of any offence is not in custody, the justice shall forthwith issue process for his apprehension, and such process shall be made returnable before any court or magistrate having jurisdiction in the premises, who shall proceed therein in the manner required by law. But nothing herein shall prevent any justice from issuing such process before the finding of such report if it be otherwise lawful to issue the same.

SEC. 15. If the medical examiner reports that the death was not caused by violence, and the district attorney or the attorney-general shall be of a contrary opinion, either the district attorney or the attorney-general may direct an inquest to be held in accordance with the provisions of this act, notwithstanding the report, at which inquest he, or some person designated by him, shall be present and examine all the witnesses.

SEC. 16. The medical examiner may, if he deems it necessary, call a chemist to aid in the examination of the body, or of substances supposed to have caused or contributed to the death, and such chemist shall be entitled to such compensation for his services as the medical examiner certifies to be just and reasonable, the same being audited and allowed in the manner herein provided. The clerk or amanuensis, if any, employed to reduce to writing the results of the medical examinatian or autopsy shall be allowed for his services two dollars per day.

SEC. 17. When a medical examiner views or makes an examination of the dead body of a stranger, he shall cause the body to be decently buried; and if he certifies that he has made careful inquiry, and that to the best of his knowledge and belief the person found dead is a stranger, having no settlement in any city or town of this Commonwealth, his fees with the actual expenses of burial shall be paid from the treasury of the Commonwealth. In all other cases the expenses shall be paid by the city or town, and all other expenses by the county wherein the body is found.

SEC. 18. When services are rendered in bringing to land the dead body of a person found in any of the harbors, rivers, or waters of the Commonwealth, the medical examiner may allow such compensation for said services as he deems reasonable, but this provision shall not entitle any person to compensation for services rendered in searching for such dead body.

SEC. 19. In all cases arising under the provisions of this act, the medical examiner shall take charge of any money or other personal property of the deceased, found upon or near the body, and deliver the same to the person or persons entitled to its custody or possession; but if not claimed by such person within sixty days, then to a public administrator, to be administered upon according to law.

SEC. 20. Any medical examiner who shall fraudulently neglect or refuse to deliver such property to such person within three days after due demand upon him therefor, shall be punished by imprisonment in the jail or house of correction not exceeding two years, or by fine not exceeding five hundred dollars.

SEC. 21. The medical examiner shall return an account of the expenses of each view or autopsy, including his fees, to the county commissioners having jurisdiction over the place where the examination or view is held, or in the county of Suffolk to the auditor of the city of Boston, and shall annex thereto the written authority under which the autopsy was made. Such commissioners or auditor shall audit such accounts, and certify to the treasurer of the Commonwealth, or the treasurer of the county, as the case may be, what items therein are deemed just and reasonable, which shall be paid by said treasurer to the person entitled to receive the same.

SEC. 22. Whenever any sheriff is a party to a suit or proceeding, or otherwise disqualified to act therein, the sheriff or a deputy sheriff of any adjoining county may serve and execute all writs and precepts, and perform all duties of such sheriff which he is disqualified to perform, and may serve and execute all such writs and precepts wherein any county, town, parish, religious society, or school district is a party or interested, notwithstanding he is at the time a member of such corporation.

SEC. 23. Whenever a vacancy occurs in the office of sheriff of any county, the senior deputy-sheriff in service shall perform all the duties required by law to be performed by the sheriff, until the office of sheriff is filled in the manner required by law, giving bond as now required by law of sheriffs. And in case of such vacancy, the deputies of the sheriff vacating the office shall continue to have and exercise the power of deputy sheriffs until said office is filled as aforesaid.

SEC. 24. Sections seventy-five, seventy-six and seventy-seven of chapter seventeen, and section one hundred of chapter sixty-three, and section eighteen of chapter one hundred and sixty-three of the General Statutes are hereby amended by substituting for the word "coroner," wherever the same occurs, the words "medical examiner," and for the word "coroners" the words "medical examiners." The second clause of section fifty-two, and sections seventy-four, seventy-eight, seventy-nine and eighty of chapter seventeen of the General Statutes, chapter one hundred and seventy-five of the General Statutes, chapter one hundred and thirteen of the acts of year eighteen hundred and sixty-one, chapter one hundred and seventy-two of the acts of the year eighteen hundred and sixty-two, chapter twenty-eight of the acts of the year eighteen hundred and sixty-four, chapter two hundred and forty-one of the acts of the year eighteen hundred and seventy-one, and chapter one hundred and fifteen of the acts of the year eighteen hundred and seventy-six, and all other acts and parts of acts inconsistent herewith are hereby repealed.

SEC. 25. For the purposes of the appointment and qualification of medical examiners and the action of the county commissioners herein provided for, this act shall take effect upon its passage, and it shall take full effect on the first day of July next.

We shall have occasion to revert to the experience of Massachusetts during the last thirteen years to show the advantages in the working of the new law. Suffice it to state in passing, that the radical changes made in this Act are: first, the doing away entirely with the office of coroner; second, the abandonment of examination by a jury on what is necessarily a preliminary trial; third, the adoption of a new plan by which a specially trained medical expert makes a scientific investigation, and properly qualified legal officials conduct the legal inquiry, preliminary to the final trial after indictment of the accused parties.

In 1881, Dr. John G. Lee, of Philadelphia, published a book entitled "Hand-book for Coroners," containing a digest of all the coroner laws in the United States. This valuable work consists of the selection, collation and arrangement of such material as the author could command, and is offered especially "as a guide for the instruction of newly elected coroners, or as a convenient hand-book for occasional and rapid reference." It does not appear to the author that any especial criticism should be made upon the laws as collated, or that there is an imperative need of a radical revision of the same. He recognizes, however, that there is often a difficulty of proper adjustment of the relation which the coroner holds to the prosecuting attorney and the other departments of justice, and concludes by saying: "If the coroner will administer his office fearlessly and according to the laws of his state, we feel sure that the clamor which periodically demands the abolition of the coroner and his functions will be heard no more."

However, the impartial critic who studies at all carefully the coroner laws as they exist in the several states would seem to require no better evidence of the need of their revision than therein contained, and as if in emphasis of this conclusion, the author adds a considerable number of pages of anecdotes full of grim humor which would be high comedy were it not for the seriousness of the subject.

In 1887 a committee was appointed by the American Medical Association, of which I was chairman, to examine into and report upon the coroner system of the United States. The first report of this committee was made at the May meeting, in 1888, supplemented by a report at the annual meetings of 1889 and 1890. At the last meeting a resolution was adopted in the general session calling the attention of the various State and district societies to this subject, requesting the members of the Association to personally investigate, and as far as possible to correct the evils inherent in the present system.

I desire by this paper to enlist the interest of the profession generally in this subject, as one eminently suitable for their investigation, and I sincerely trust that the influence of this learned body may be exercised in behalf of a much needed reform. It had been my purpose to examine in detail the laws in effect in each of the several States and Territories, and to this end I entered into correspondence with the secretaries of the various boards of health, and other prominent officials, and I have, as the result therefrom, collected a large amount of valuable material. However, the limit of this paper prevents an analysis in detail. The essential principles of the coroner laws (except in Massachusetts, Connecticut and Rhode Island) are very similar in all the States, and it is a source of absolute wonder how such an absurd and valueless office for

the detection of crime should have continued through all these years.

These laws owe their origin very naturally to the laws of England, and were first adopted in the early colonial days. The conservatism of English thought is nowhere better exemplified than in the history of her legal enactments. The primary medico-legal inquiry in cases of death by violence has been conducted in England by the coroner's inquest for the last thousand years, and has not been essentially changed for several centuries. According to Sir Thomas Smith, who wrote in 1583, the name of the office originated from the word "Crowner," or "Coromator," because "the death of every subject by violence is accounted to touch the Crowne, and to be a detriment to it; in other words, the coroner was a representative of the Crown." The system of trial by jury has ever been very dear to the English heart, and this, in the earlier days of English history, when society was less complex than at present, was very properly associated with the duties of the coroner system. Then both pathology and chemistry were in their infancy, and the combined judgment of the average citizen represented the highest verdict of public opinion.

In the early part of the present century, Mr. Thomas Wakeley, the able editor of the London *Lancet*, pointed out the inefficiency of the coroner laws as practiced in England, and demanded that the office of coroner should be filled by a competent medical man, since which time the coroner in England has usually been selected from among the better class of medical practitioners.

At the present time, in nearly all the States of the Union, the coroner's office is considered one of political preferment, and as such, is subject to party politics, holding the office not seldom as a subsidy for supposed services rendered, rather than because of fitness to discharge duties of so great importance to the State.

In the progress of legal learning, as well as in medical science, these two great branches of special knowledge have outgrown their former status, and to be well versed in both is beyond the training and education of the present generation.

The object of a medico-legal inquiry is manifestly the detection of crime, and the evidence sought is the direct cause of death and the identity of the individuals committing the crime. To ascertain the cause of death, it often requires the highest qualification of a pathological expert. The post-mortem examination must often be made in a thorough and skillful manner, and must frequently be supplemented by a careful and exhaustive chemical research. To this portion of the subject an especially trained medical expert limits his inquiry. Here, in the large majority of cases requiring investigation, the examination should end, since by it, it is clearly determined that death has been due to natural causes, and that the case does not come within the limit of criminal investigation. In such cases, at least, it is a useless and unnecessary expense to summon jurymen, and too often calls the attention of the public through the press to a subject keenly painful to all parties involved.

If death has not occurred from natural causes, the question then arises, has a crime been committed? In all doubtful cases, the evidence of this is largely determined by a careful, competent and thorough medical examination. When this has been fairly established, the further investigation of the relation of "the party or parties to the act" becomes a purely legal one, and here, singularly, the evidence, as usually rendered by the verdict of a coroner's jury, is generally considered of little value. In an able article[1] by Mr. Clark Bell, of New York, entitled "The Coroner's Office; Should it be Abolished?" he writes: "There can probably be no more startling evidence of the utter uselessness of a coroner's jury than the statement of this fact, that whatever may be the verdict in a given case, the subsequent indictment, trial, and entire judicial proceeding is absolutely independent of it, and proceeds as if the coroner's jury had never acted at all. . . .

"We cannot be too jealous of the right of trial by jury, but in all cases under existing law two juries must agree before any person can be convicted of crime, without counting the coroner's jury, viz: the grand jury which presents the indictment, and the jury in the trial of the accused after indictment; so that the abolition of the jury on the preliminary inquiry, and a change as to who shall make the inquest in its stead, is not in any sense true an infringement upon the right of trial by jury which in all cases would exist if the proposed change was made."

Under the coroner system, as in actual use in the various States, much time is frequently lost by reversing what seems the proper order of procedure. A jury is summoned, witnesses are heard, and at last it is determined that a post-mortem examination is necessary, and yet, it is often of the greatest importance that the autopsy be promptly made, before decomposition is pronounced.

In a subject the fundamental principles of which are of universal application, it may be well to broaden the inquiry as to the methods adopted by the great nations of Europe which cover the important duties relegated to the coroner's inquest in England and America. For an excellent resumé of the same, I take pleasure in making reference to the valuable articles of Mr. Bell from which I have just quoted.

FRANCE.

In France two distinct and separate officers

[1] The Medico-Legal Journal, September, 1890.

take charge of all medico-legal investigations. The legal officer, attorney of the republic, is an authority not unlike the district attorney of our States. He makes a record of evidence, has the power of seizing articles or papers if connected with crime, and can temporarily hold in durance suspected persons. He may employ detectives, and is held responsible for all the legal questions involved. The scientific investigation is under the charge of a competent medical expert, especially selected for the office, who has full power, and is held responsible for a careful, scientific investigation.

GERMANY.

The present law of the German Empire was adopted in 1879. The judicial officer (staatsanwalt) is called the district attorney. The police are his subordinates as officers of the law in the investigation of crime. They are obliged to report to this officer all cases of sudden death or death by violence, and no interment of the body is allowed until after the consent has been obtained from this officer or a competent court. Medical examinations are made by experts especially selected for this purpose, who are summoned by the above mentioned authorities, and they in all respects conduct the examination. Upon the evidence of the preliminary examination, the district attorney enters suit before a competent court.

SCOTLAND.

The law in Scotland is analogous to that of France.

GREECE.

The system in force in Greece is almost identical with that of France. A medical officer takes exclusive charge of the medical question of the examination, and detectives, or experts trained to the business, are subject to the call of the prosecuting officer.

RUSSIA.

The officer designated in charge of the medico-legal examinations is known as judge of the institute; is an officer of the Crown, appointed in and for each district by the central governor or council of the province or state. He is possessed of large powers, and may even place in close confinement an accused or suspected person. The medical side of the case is in charge of a physician who is a salaried officer under the Crown. He conducts autopsies, and carefully reduces his examination and conclusions to writing, which he furnishes to the court, and also to the central medical council, or board, held in every province at the seat of the government, who have a power of review of the same in case doubt exists.

In 1883 a new law was enacted in Connecticut, appointing a properly qualified attorney as a coroner for each county, and a medical examiner for each town. I quote briefly from a letter written me upon the subject by Dr. M. C. White, medical examiner for New Haven: "One feature of our new law, giving all the business of the county to one lawyer, secures immediate investigation by an experienced officer who understands law and the best methods of examining witnesses. . . . He must investigate immediately all suspicious cases. He may call a jury. All this works admirably. Three-fourths of all the sudden, violent or untimely deaths are disposed of by the medical examiners, reported and recorded, but require no legal investigation, since there is no suspicion of crime. . . . After nearly five years experience under the present law, I think the defects or questionable points are so few that we may say there is very general satisfaction with the law."

Rhode Island somewhat recently passed laws similar to those of Massachusetts, and Dr. Chas. H. Fisher, secretary of the State Board of Health, writes me "that it is a great improvement upon the preceding law and methods."

I am indebted to Dr. Samuel W. Abbott, the efficient secretary of the Massachusetts Board of Health, for most valuable information upon the working of the law as enforced in this State since 1877. I take pleasure in referring to a valuable article published by Dr. Abbott in the *Forum* for 1889, entitled "The Defects of the Coroner System." Under the new regimé, about 15,000 cases of death from sudden, suspicious, violent or unknown causes have been investigated in a manner much more satisfactory than was possible under the old system. "Another important feature of the new method of procedure is the decided lessening of expense. Under the coroner system, the cost of executing the law for three years (1874, 1875, 1876) was found to be $63,712 04, and under the new law it was $54,509.31 for the three years (1878, 1879, 1880), a decrease of $9.202.73, or more than three thousand dollars per year, notwithstanding an increase in the population of about eight per cent. The principal reasons for this diminished expense are found in the abolition of the jury, and in the decrease in the number of inquests. The ratio of inquests to cases investigated under the old law was forty per cent, while under the present law for the period of eleven years (1877–1888) it has been but twenty per cent, or half as many."

In review of the celebrated Barron case, in Maine, which created a wide interest outside of the State, Dr. Abbott wrote a valuable criticism, from which I quote. In the trial of one Stain, as having committed the murder, the chief question of interest was the uncertainty as to the exact cause of death: "The cashier of the Dexter bank was found dead in the vault of the bank under suspicious circumstances. Marks of violence were found upon his head. Two theories were advanced, and the little community of Dex-

ter became divided as to the question of murder or suicide. What would have been the most reasonable course to pursue under such circumstances? An immediate and thorough examination of the body, especially of the brain and stomach, would undoubtedly have settled the question of murder or suicide at once.

"What was actually done? The good-natured coroner (to use the words of the account printed at the time of the affair) deferred to the wishes of the family, and *made no autopsy*. Then came the farce of a coroner's jury. Six men sat in solemn conclave and pronounced a verdict, and of what possible value was the verdict?"

From the advanced sheets of the report of the State Board of Health, Dr. Abbott furnishes me the following statistical table:

EXPENSES OF MEDICAL EXAMINATION FOR 1889.

The total expenses of the medical examinations for the year 1889, including the cost of registration, was $19,489.69. The average cost of each of the 1,654 medical examinations was $11.78. In Bristol, Essex, Hampden, Hampshire and Middlesex the expense was greater, and in the remaining counties it was less, than that of the previous year.

The expenses of the four years 1885–1889 were as follows:

YEAR.	Total Number of Cases Examined.	Autopsies.	Total Expenses.	Average Expense of Each Case.
1885	1,260	165	$16,322.54	$12.95
1886	1,378	202	18,024.22	13.08
1887	1,556	188	18,626.26	11.97
1888	1,651	219	19,611.53	11.88
1889	1,654	216	19,489.69	11.78

In the following itemized table are presented the expenses of conducting the medical examinations in each county and for the whole State, for the year 1888:

Expenses incurred in conducting the Medical Examinations required by the Medical Examiner Laws of Massachusetts.—1889.

COUNTIES.	Number of Cases.	Autopsies.	Fees of Medical Examiners.	Mileage.	Witnesses and Clerks.	Chemists and Other Experts.	Burial, Removal, Recovery and Care of Bodies	Incidentals.	Totals.
Barnstable	13	. .	$65.00	$27.10	. . . . .	. . . . .	$6.00	$0.95	$99.05
Berkshire	51	6	405.00	42.40	$41.00	$50.00	15.00	12.50	565.90
Bristol	132	7	835.00	59.40	58.00	160.00	26.00	10.40	1,148.80
Dukes	4	. .	20.00	3.30	6.00	. . . . .	. . . . .	. . . .	29.30
Essex	203	16	1,415.00	82.70	106.00	100.00	23.50	10.00	1,737.20
Franklin	15	. .	75.00	24.30	. . . . .	. . . . .	. . . . .	. . . .	99.30
Hampden	126	14	980.00	77.60	134.00	435.00	217.00	31.50	1,875.10
Hampshire	24	5	245.00	36.99	18.00	. . . . .	7.00	. . . .	306.99
Middlesex	276	19	1,855.00	174.55	136.00	50.00	124.00	. . . .	2,339.55
Nantucket	2	. .	10.00	. . . . .	. . . . .	. . . . .	. . . . .	. . . .	10.00
Norfolk	84	8	620.00	51.65	72.80	50.00	12.50	. . . .	806.95
Plymouth	39	4	295.00	57.30	17.50	. . . . .	. . . . .	6.00	375.80
Suffolk	533	125	6,500.00	169.50	970.00	275.00	562.75	. . . .	8,477.25
Worcester	152	12	1,060.00	115.10	113.00	. . . . .	100.50	. . . .	1,388.60
Totals	1,654	216	14,380.00	$921.89	$1,672.30	$1,120.00	$1,094.25	$71.35	$19,259.79
Registration	. . . .	. . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . . .	. . . .	229.90
									$19,489.69

Abolition of the Coroner in Massachusetts," by T. H. Tyndale, Esq:[2] "With the abolition of the composite functionary and of the jury, a highly-trained class of 'medical examiners,' an office gladly accepted by the first physicians in the State, we open the door for special interest in, and previously unknown penetration into, fields of detailed investigation of pathology; we have laid the foundation of a valuable body of observed facts, as shown by the publication of our Medico-Legal Transactions, contributed entirely by the medical examiners; we have attained accuracy, and we have never, since the passage of the Medical Examiner Act, failed in a single prosecution, for want, or insufficient clearness of the medical testimony. The previous statistics were—some hundreds of inquests annually—some tens of convictions. Now the great majority of prosecutions begin with the skillful investigation of trained men, acting promptly and delayed by no cumbersome, meaningless machinery, and end in convictions. . . . We have attained that greatest deterent of crime, the chief terror to criminals—swiftness in discovery and certainty in punishment.

Incidentally, a gain dear to the lover of social cleanliness and morality has been obtained. I refer to the total disappearance from the press—except as news from other States—of the nauseous and offensive details formerly furnished by the coroner's inquest, and eagerly sought after by the prurient curiosity mongers. These changes have been wrought by a simple act, abolishing the office of coroner, and appointing for Boston two, for each other county in the State some four medical examiners whose business is solely

In evidence of the great value of the working of the new law in Massachusetts, I quote from an exhaustive article upon the subject, "The the physical examination and subsequent giving of testimony. . . . The new system has now

[2] The Medico-Legal Journal, March, 1890.

been in operation about twelve years, and has proved itself capable of exact and valuable work; no instance of willful dereliction of duty under it has taken place. It has now the commendation of judges, prosecuting officers, and the general public, and may fairly be pronounced a step in the direction of purifying the public service."

The limit of time at my disposal prevents a more detailed discussion of a subject of such vast importance, and in closing I desire to commend for earnest consideration in each of the several States the following propositions:

1. To abolish the office of coroner.
2. To dispense with jury service.
3. To separate the medical from the legal duties in all cases involving the examination into the causes of death where crime is suspected.
4. To entrust the medical examination only to competent medical officers properly trained in their work.
5. To make the number of these medical officers as small as consistent with the proper discharge of their duties.
6. To consign all questions of law only to properly qualified legal magistrates.
7. To remove the appointment of these officers entirely from the question of political consideration; and to be based only upon their possession of the requisite and proper qualifications.

Upon some basis of this character should the coroner's laws be revised. Much useless expenditure of time and money will be avoided, often great sorrow and anxiety will be prevented, and that which is of vastly greater importance, the ends of justice will be far better served.

SICKNESS AND MORTALITY IN THE ARMY OF THE UNITED STATES.

Read in the Section of State Medicine, at the Forty-second Annual Meeting of the American Medical Association, held at Washington, D. C., May, 1891.

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All statistics telling the amount of disease and death in any considerable portion of the community, and showing the variations in said amount from year to year, seem properly to belong to State Medicine.

As there is no Section of military medicine and surgery in the American Medical Association, I deem it proper to present to the Section on State Medicine the following paper, in which I have collated and compared figures showing the absolute and relative amount of disease, death, and non-effectiveness in the Army of the United States.

While these statistics have been collected under conditions of considerable uniformity from year to year, yet it is to be remarked, that they have been collected by a large number of observers, all of them medical officers of education and intelligence, yet each differing from the other in powers of observation, and in mental characteristics or peculiarities.

To some, this last named fact will make the statistics more reliable and valuable, than if they had been collated and reported by a single individual; to others, less reliable and valuable.

In 1882, I presented to the American Medical Association a paper which was printed in its Transactions, and contained the health statistics of the U. S. Army for eleven years—from 1871 to 1881 inclusive.

I now present similar data from the annual reports of the Surgeon-General for a period of nine years, from 1882 to 1889 inclusive.

TABLE I,

Showing the Sickness and Mortality from Disease in the Army of the United States during the years 1882–1889, inclusive.

YEAR ENDING	Cases per M. of mean strength reported as taken on sick report for disease.			Deaths from disease per M. of mean strength.			Deaths from disease per M. of cases of disease treated.		
	White.	Colored.	Total.	White.	Colored.	Total.	White.	Colored.	Total.
June 30, 1882	1461	1537	1468	6.79	7.06	6.81	4.65	4.60	4.64
" 1883	1570	1620	1575	6.98	6.28	6.91	4 45	3.87	4.39
" 1884	1583	1558	1580	8.80	6.50	8.56	5.56	4.17	5.42
Dec. 31, 1884	1236	1458	1257	7.27	9.15	7.45	5.88	6.28	5.92
" 1885	1110	1203	1118	4.92	3.19	4.76	4.43	2.65	4.26
" 1886	1017	1236	1036	6.53	4.67	6.36	6.43	3.78	6.14
" 1887	992	1094	1002	6.02	8.48	6.25	6.06	7.76	6.24
" 1888	1013	1164	1028	6.05	11.59	6.59	5.97	9.95	6.41
" 1889	1073	997	1066	3.98	7.45	4.32	3.71	7.47	4.05
Total for whole period of nine years	1222	1319	1231	6.33	7.20	6.42	5.18	5.47	5.21
Total in former Reports for eleven yrs.	1551	1498	1546	8.45	11.40	8.71	5.45	7.61	5.63

The number taken sick or dying from disease, and the number constantly sick at different times, are both, in their own way, measures of the health of an army; each has its own peculiar value.

The difference between the numbers admitted on sick report for disease in the two periods tabulated in 1882 and now, might be due to difference of physique of the soldiers, to differences in the nature of their service, and to differences in the sanitary care and attention bestowed upon them.

So far as can be discovered, the material in both periods was about the same; the nature of the service was unchanged. So, reasoning by exclusion, better sanitary care and attention must have been mainly or entirely operative in causing the decrease of numbers taken sick during the period 1882 to 1889 inclusive.

Differences in the ratios of those dying from disease (not injury) per 1,000 of mean strength, might be due to these above named causes, and, in addition, to a difference in the character or constitution of each individual disease, and to better therapeusis.

As before, the first two causes may be excluded. A difference in the character of the diseases has not been proved, or even asserted; rest, the improvements in sanitation and therapeusis, as the effective factors.

The difference in the ratio of those dying from disease per 1,000 of cases of disease, would seem, besides the above named causes, specially due to either a difference in the character of the disease; that is, a greater or less tendency to death, or to better treatment, these two being either combined or complementary; one more efficient as the other is less so.

The importance of the ratios of constant non-effectiveness as a measure of comparative health, was first emphasized by the Surgeon-General of the Army in his report for 1888. The writer of the pages in that report, on the health of the Army as a whole, says: "The actual impairment of force which the Army suffers on account of sickness, as well as the relative importance of the various causes of sickness, cannot be measured with any degree of accuracy by the number of admissions to sick report, but they are shown very clearly by the aggregate loss of time which these admissions individually and collectively cause, and from this aggregate the average non-effectiveness can be accurately and readily determined."

So it is desirable to consider these data, and I have accordingly constructed a new table, containing figures relating to non-effectiveness. I have also added the ratios of "deaths from all causes," the foregoing tables including only those from disease. It is apparent that the difference between the ratios of deaths from disease, and deaths from all causes, is the ratio of deaths from injury, violence, etc.

I have deemed it best also to add the figures for some years preceding 1871—and I have commenced with 1867, because during that year the Army was reduced from a war to a peace footing, and because in that year appeared first the statistics of average or mean strength (termed in the reports "average" for the years 1867, 1868, 1869, 1886, 1887, 1888 and 1889, and "average mean" for other years), the number taken on sick report for disease, the number taken on sick report for injury, the mortality, and the constant sickness rate, all for whites and blacks separately, for the fiscal year ending June 30, to which year the rest of the report refers. Similar data have appeared in each annual report since, until 1885.

In the annual report dated October 1, 1885, and subsequent annual reports of the Surgeon-General, while the rest of the report refers to the previous fiscal year, ending June 30, the health statistics relate to the calendar year next preceding.

TABLE II.

YEAR ENDING	Ratio, per M. of mean strength, admitted for disease.			Ratio of deaths from disease, per M. of mean strength.			Ratio of deaths from disease, per M. admitted for disease.			Ratio of deaths from all causes, per M. of mean strength.			Ratio of deaths from all causes, per M. of admissions for all causes.			Ratio constantly sick, per M. of mean strength.		
	White.	Colored.	Total.	White.	Colored.	Total.	White.	Colored.	Total.	White.	Colored.	Total.	White.	Colored.	Total.	White.	Colored.	Total.
June 30, 1867	2717	2865	2737	37.15	114.46	47.79	13.68	39.95	17.46	40.92	120.71	51.90	13.77	40.22	17.44	58.00	45.00	57.00
" 1868	2628	2838	2648	25.96	50.69	28.32	9.88	17.86	10.70	29.90	56.14	32.40	10.28	18.34	11.09	63.02	59.28	62.66
" 1869	2320	1859	2272	9.89	12.67	10.17	4.26	6.81	4.48	12.85	17.59	13.34	4.96	8.43	5.26	58.17	52.78	57.61
" 1870	1855	1608	1829	8.58	14.97	9.25	4.63	9.31	5.06	12.89	19.37	13.57	5.98	10.63	6.40	48.89	52.25	49.25
" 1871	1863	1137	1804	12.36	10.74	12.23	6.63	9.44	6.78	17.67	18.80	17.77	8.17	13.80	8.47	50.40	39.88	49.54
" 1872	1671	1178	1624	11.12	17.64	11.73	6.65	14.97	7.22	15.23	21.65	15.83	7.71	15.37	8.24	50.50	41.30	49.63
" 1873	1666	1438	1645	9.90	18.25	10.67	5.94	12.69	6.48	16.58	21.03	16.99	8.45	12.31	8.76	49.07	48.41	49.01
" 1874	1514	1539	1515	8.92	10.01	9.02	5.89	6.51	5.95	13.30	14.82	13.43	7.43	8.16	7.49	46.40	52.06	46.90
" 1875	1420	1417	1419	7.39	13.34	7.95	5.21	9.42	5.60	10.92	16.47	11.43	6.49	9.79	6.79	43.11	49.84	43.74
" 1876	1499	1469	1496	8.30	7.99	8.28	5.54	5.44	5.53	23.89	12.99	22.97	13.79	7.51	13.26	43.49	51.95	44.21
" 1877	1462	1821	1510	7.73	7.23	7.69	5.21	3.97	5.09	11.17	15.42	11.51	6.47	7.36	6.56	44.06	47.71	44.36
" 1878	1270	1607	1298	5.82	10.03	6.17	4.58	6.24	4.75	12.31	16.89	12.69	8.27	9.31	8.37	41.45	41.69	41.47
" 1879	1505	1775	1527	7.46	7.70	7.48	4.95	4.34	4.89	12.25	14.38	12.42	7.04	7.12	7.04	44.44	39.55	44.03
" 1880	1519	1512	1518	5.70	8.87	6.01	3.75	5.86	3.96	9.91	19.43	10.83	5.60	11.35	6.14	44.62	37.58	43.93
" 1881	1513	1745	1536	6.14	11.09	6.64	4.06	6.35	4.32	9.31	20.48	10.42	5.27	10.32	5.83	44.05	45.22	44.16
" 1882	1461	1537	1468	6.79	7.06	6.81	4.65	4.60	4.64	10.40	11.04	10.46	6.19	6.10	6.18	45.34	44.15	45.22
" 1883	1570	1620	1575	6.48	6.28	6.91	4.45	3.87	4.39	10.23	10.88	10.30	5.68	5.54	5.66	47.48	40.59	46.77
" 1884	1583	1558	1580	8.80	6.50	8.56	5.56	4.17	5.42	12.36	9.53	12.07	6.74	5.05	6.57	49.58	43.74	48.98
Dec. 31, 1884	1236	1458	1257	7.27	9.15	7.45	5.88	6.28	5.92	10.72	13.07	10.94	7.10	7.45	7.14	44.02	48.80	44.48
" 1885	1110	1203	1118	4.92	3.19	4.76	4.43	2.65	4.26	7.66	6.38	7.54	5.66	4.24	5.52	40.92	42.39	41.06
" 1886	1017	1236	1036	6.53	4.67	6.36	6.43	3.78	6.14	9.94	7.94	9.76	8.02	5.29	7.73	39.01	43.42	39.41
" 1887	992	1094	1002	6 02	8.48	6.25	6.06	7.76	6.24	8.70	11.61	8.98	7.07	8.31	7.20	42.04	44.07	42.38
" 1888	1013	1164	1028	6.05	11.59	6.59	5.97	9.95	6.41	8.16	14.90	8.82	6.53	10.17	6.94	41.62	44.56	41.90
" 1889	1073	997	1066	3.98	7.45	4.32	3.71	7.47	4.05	6.55	10.34	6.92	4.97	8.07	5.26	44.44	41.09	44.12

TABLE III.

For the four years, 1867 to 1870, inclusive	2420	2407	2427	21.78	57.77	26.78	8.96	24.00	10.62	25.51	63.19	29.69	9.43	24.31	11.02	57.80	50.93	57.04
For eleven years, 1871 to 1881, inclusive	1551	1498	1546	8.45	11.40	8.71	5.45	7.61	5.63	14.01	17.68	14.34	7.72	10.15	7.93	45.85	45.01	45.77
For nine years, 1882 to 1889, inclusive	1222	1319	1231	6.33	7.20	6.42	5.18	5.47	5.21	9.36	10.69	9.49	6.40	6.61	6.43	43.76	43.84	43.77
For whole period of twenty-four years	1667	1708	1671	11.14	23.69	12.35	6.68	13.87	7.39	15.42	28.82	16.72	8.02	14.74	8.67	44.10	42.45	43.93

This and subsequent reports also fail to give the constant sickness rates for disease and injury separately. No reason was given for these changes, nor is one apparent which is entirely satisfactory.

In consequence of them, accurate, rigorous comparison is prevented between figures of preceding and subsequent reports, and the report referred to embraces statistics for six months common to it and the previous report.

Consequent on these omissions, my table does not contain the non-effective rates for disease and injury separately, but the rate for both combined.

This same report of the Surgeon-General, for the first time gives data as to the number of days' service lost in consequence of admissions to sick report.

Explanatory of some of the figures in these tables, the text of the reports of the Surgeon-General states that 1,310 deaths from cholera occurred in 1867.

That cholera and yellow fever combined caused 681 deaths in 1868, and that yellow fever to a limited extent occurred in 1869, 1874, 1875, 1876, 1877, 1878, 1883 and 1884.

The text states that for the year 1870, "the comparatively large mortality from wounds, accidents and injuries, is explained by the Indian hostilities;" and it shows the same, in 1876, to be mainly due to the Custer massacre.

For the year ending June 30, 1884, the text reads: "It is interesting to note that not only is this the lowest death rate yet reached among colored troops since their organization, but it is the first time that the rate has fallen lower than that for white troops, the usual average difference being 3.2 per thousand of mean strength in favor of the latter class."

For the year 1885, the text says: "It is a matter of congratulation that not only the admission rate for the troops, but also the death-rate, has fallen to a lower point than at any time within the history of the Medical Department."

I remark here that my tables show that, for the succeeding years 1886, 1887, 1888 and 1889, the admission rates, though not the death-rates, for all causes, were still lower.

In the report for the year ending December 31, 1884, the text of the report of the Surgeon-General mentions the "mean strength" obtained from the reports of the Adjutant General of the Army, which varies from the "mean strength" obtained from the reports of medical officers from which all preceding rates had been calculated. The text says that the death and discharge rates in these tables, so calculated, are "higher than they should be," as the figures given by medical officers do not embrace the whole strength of the Army. The subject was only considered of enough importance to be mentioned in a foot-note merely, and it is so mentioned in a foot-note in the report of the ensuing year.

In the report for 1886, the matter is more fully treated of, and the difference between the two "mean strengths" is fully recognized, that given by medical officers being generally the smaller.

The reason is shown why the "mean strength" reported by the Adjutant General is the proper strength from which to calculate ratios of deaths and discharges, and these ratios are, in the 1886 and subsequent reports, calculated from the figures of the Adjutant General, while rates of admission and non-effectiveness are calculated from the figures of mean strength given by medical officers—the same is the case for succeeding years.

It may here be remarked that, from many points of view, this report of 1886 shows a distinct advance beyond its predecessors.

It is manifest that for purposes of comparison within themselves, the ratios of all reports must be calculated on similar data, and those data given.

As the data given in the reports before 1886 will not enable us to calculate ratios for these years on the figures of the Adjutant General, I have used for the ratios of every year in tables II and III, the figures given by medical officers.

The exact difference between these two "mean strengths" appears below, the figures being taken from all the annual reports of the Surgeon-General which give such figures.

MEAN STRENGTH OF ARMY.

YEAR.	White.		Colored.		Total.	
	By Returns from A.G.O.	By Reports of Medical Officers.	By Returns of A. G. O.	By Reports of Medical Officers.	By Returns of A. G. O.	By Reports of Medical Officers.
1884	. . .	. . .	. . .	. . .	26,124	24,033
1885	. . .	. . .	. . .	. . .	26,542	24,138
1886	23,737	21,430	2,358	2,142	26,095	23,572
1887	23,937	21,601	2,428	2,240	26,365	23,841
1888	24,103	22,310	2,636	2,416	26,739	24,726
1889	24,723	22,591	2,610	2,417	27,333	25,008

The difference in the ratios computed from these main strengths is given below:

YEAR.	Ratio admitted for disease by figures from Returns of Medical officers, *vide* Table 2.	Same per Returns from A. G. O.	Ratio of deaths per M. of mean strength, from Reports of Medical Officers, *vide* Table 2.	Same from Returns from A. G. O.	Ratio of deaths from all causes per M. of mean strength, calculated from Reports of Medical Officers, *vide* Table 2.	Same from Returns from A. G. O.	Constantly sick, from Reports of Medical Officers, *vide* Table 2.	Same, from returns from A. G. O.
1884	1257	1157	7.45	6.85	10.94	10.02	44.48	40.92
1885	1118	1017	4.76	4.33	7.54	6.86	41.06	37.34
1886	1036	936	6.36	5.75	9.76	8.81	39.41	35.60
1887	1002	906	6.25	5.65	8.98	8.12	42.36	38.31
1888	1028	950	6.59	6.09	8.82	8.15	41.90	38.74
1889	1066	976	4.32	3.95	6.92	6.33	44.11	40.34

Since 1883, I have given much attention to the question of the correct mean strength of the Army. For many military posts, month after month, I have compared the figures in the reports of the Adjutant General, the figures given by medical officers, and the actual numbers on which these figures are based. It would take too much space to give all the grounds for my convictions, which I therefore merely recite, as follows:

As stated in the text of the report of the Surgeon-General for 1886, the figures in the report of the Adjutant General are the proper data on which to compute ratios of deaths and discharges.

But neither the mean strength given by the Adjutant General, nor that obtained from reports of medical officers, are correct for the calculation of ratios of admission and constant sickness.

The figures of the Post-Surgeon should be the basis with certain additions which have been habitually omitted, but which may be easily ascertained and which may in future be supplied.

In consequence of using the figures given by Post-Surgeons, without the corrections above indicated, for comparison with the statistics of other armies, all the ratios in Tables 2 and 3 are too high; and the amount of correction should be probably in accordance with the figures immediately preceding, which show the differences as computed by the different mean strengths.

In the report of the Surgeon-General for the year ending June 30, 1884, the number of cases of typhoid fever is given in the different arms of the service, and among recruits and older soldiers. No attempt is made to explain the differing conditions of these different arms; and as it will hardly be supposed that typhoid fever favors a man simply because he is a cavalry or artillery man, the remarks under this head are not of very great significance.

Elsewhere remarks are made as to the greater or less prevalence of this disease at various posts, where more or less unsanitary condition is also treated of.

The next annual report, 1885, again mentions the greater prevalence of the disease among cavalry men, and gives further details about the posts where prevalent.

Data are also given as to age and length of service of those affected.

In the same report appear tables to show the influence on mortality of rank, age, arm of service, race and nationality, and season of the year; also the relation of discharges for disability to arm of service, age, and season.

Data of a similar nature, more or less complete, appear in all subsequent reports.

The text of the report for 1889 speaks of the death rate as the lowest annual death rate in the history of the Army, and makes pertinent comment on the effect produced by the number of discharges for disability on certain other health statistics of the Army.

On critical examination of the figures in Tables 2 and 3, it will be evident, that taking for a measure the admission ratios on account of diseases exclusive of injury, the figures are most favorable for the black troops for the period of four years, 1868-70 inclusive, and the period of eleven years 1871-81 inclusive; but most favorable for the white troops for the period of nine years 1882-9 inclusive, and the period of the whole twenty-four years.

Taking for our measure the mortality ratios the figures are most favorable for the white troops for each and every period given separately in Table 3.

Taking for our measure the non-effective rate the figures are slightly in favor of the whites for nine years, 1882-9 inclusive, and much more in favor of the blacks for all the other periods.

It farther appears that the death rates are more nearly equal for whites and blacks in the latter period of 9 years, 1882-9 inclusive, than in the preceding two periods. That is to say, the blacks are overtaking the whites in the race of which longevity is the goal.

As regards the admission ratios for disease and the ratios for non effectiveness, the white troops in the last period of nine years have overtaken and a little passed the blacks.

For obvious reasons, the general deductions from the figures relating to longer periods of service are more valuable than those from the figures relating to individual years; yet attention may be called to the fact that for the last year, 1889, the admission rate for disease and that for constant sickness are in favor of the black troops; while the mortality rates are considerably in favor of the white troops, while in general, the year, as regards vital statistics, was one of the best in the Army's history.

It will be further noticed that the indications from admission rate for disease, mortality rate, and constant sickness rate, are unanimously in favor of any one color but for seven years of the 24, viz: in 1874, 1878, 1881, 1885, 1887, and 1888, in favor of the white; in 1884 in favor of the black troops.

For about three-quarters of the years given, the health of the white troops has been the best, as measured by rate of admission for disease and death rate.

Measured by rate of non-effectiveness, the white troops have been less affected by disease than the blacks for twelve years, and the blacks less than the whites for twelve years.

The maximum admission rate for disease among the whites, viz.: 27.17 per thousand of mean strength, occurred in 1867; the minimum, 992, in 1887.

The maximum of the same rate among the colored troops, 28.65 per thousand, occurred in 1868; the minimum, 997, in 1889.

The maximum death rate per thousand of mean strength among the white troops, viz,: 37.15 occurred in 1867; the minimum 3.98, in 1887.

The maximum for the same rate among the colored troops, viz.: 114.46 per thousand, occurred in 1867; the minimum, 3.19, in 1885.

The maximum of non-effectiveness among the white troops, viz.: 63.02 per thousand, occurred in 1868; the minimum, 39.01' per thousand, in 1886.

The maximum of the same among colored troops, 59.28 per thousand, occurred in 1868; the minimum, 37.58, in 1880.

The maximum death rate for disease per thousand of cases of disease treated among the whites, viz.: 13.68 per thousand occurred in 1867; the minimum, 3.71, in 1889.

The maximum of same ratio among colored troops, viz.: 39.95 per thousand occurred in 1867; the minimum 2.65, in 1885.

I am unable in the reports of the Surgeon-General or elsewhere to find facts reported which adequately explain all the fluctuations in the figures of Tables 2 and 3, and without further remark I offer the foregoing figures and comments to the students of Army and other vital statistics, only adding that the figures given point unmistakably to the conclusion, that in the latter series of years tabulated, the amount of sickness and mortality was less than in the former series.

THE DUTY OF THE GOVERNMENT IN THE PREVENTION OF TUBERCULOSIS.

Read in the Section of State Medicine, at the Forty-second Annual Meeting of the American Medical Association, held at Washington, D. C., May 5, 1891.

BY LAWRENCE F. FLICK, M.D.,
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We read in the Declaration of Independence of the United States, "We hold these truths to be self-evident, that all men are created equal; that they are endowed by their Creator with certain unalienable rights; that among these are life, liberty, and the pursuit of happiness. That, to secure these rights, governments are instituted among men" . . . . All governments, indeed, which have been constituted upon the principles laid down in the great Magna Charta, have, as one of their foremost duties, the preservation of the lives and health of the people. The Common Law of England sums up the rights of individuals under three principal articles; namely: "the right of personal security, the right of personal liberty, and the right of private property;" and defines the right of personal security to consist, "in a person's legal right and uninterrupted enjoyment of his life, his limbs, his health, and his reputation."

In the earlier days of civilization many diseases were looked upon as providential visitations, and therefore non-preventable. In the Common Law of England, however, the principle that the government is bound to take every possible precaution against the spread of disease is well defined, not only indirectly by declaring for the preservation of life and health, but directly by providing penalties for persons offending against public health, or spreading such diseases as were then looked upon as contagious. The Common Law of England is operative in principle in most of the States of our Union; and its provision for life and health are affirmed in the Constitution of probably most of the States. Section 1 of the Constitution of Pennsylvania reads: "All men are born equally free and independent, and have certain inherent and indefeasable rights, among which are those of enjoying and defending life and liberty, etc." The words defending life must be given a broader interpretation than mere defense against the anger of a fellow man. A reasonable interpretation makes it a defense against every danger to life for which the ingenuity of man has constructed a defense.

Modern science teaches us that many of the diseases, which were formerly looked upon as divine visitations, are but ordinary warfares between various forms of organic life for self-existence; and that when death ensues it is the going under of the weakest and the survival of the fittest. Man, the most perfect and the most intelligent of all of God's creatures, falls a victim to the onslaughts of organisms so minute that they can only be seen by the aid of most powerful lenses. What these little warriors lack in size they make up in number, and in their great power of reproduction and multiplication. The organism of man, so perfect in its construction, so complex in its machinery, and so complete in its equipment for defensive warfare against parasitic vegetation, ought never to prove the weakest in a contest with organisms so primitive in construction as are disease germs. But the tiniest and the simplest organism becomes a power when acting in concert with a large enough number of organisms of its own kind. There is a law in Nature that the smaller and more primitive an organism, the more rapid its reproduction, and in pursuance of this law, disease germs, when they once gain entrance into proper soil, multiply so rapidly that the mechanical obstruction of their presence in itself becomes a menace. It is in this their great numbers that they become great and prove themselves the victors in the contest for survival.

Ever since man has inhabited the earth he has

bethought himself of ways and means to escape and overcome disease. The accumulated thought and ingenuity of centuries has at last demonstrated to us how some diseases can at least be avoided. We now not only know that disease is mostly due to a living organism, but of some diseases we have learned enough about the organism that we can lay down pretty definite rules as to how to circumvent its development. We know what kind of soil it needs, how it is transplanted from person to person, or from persons to animals, and from animals to persons, what will readily destroy it outside of its host, how it is influenced by temperature and moisture, etc. We know, in fact, how we can prevent it from propagating any longer among us, and thus drive it entirely from our midst.

Of all diseases, the one concerning which we have this knowledge with the greatest accuracy, is tuberculosis. So dreadful has been the onslaught of this disease upon the human family that in all ages, from the days of Hippocrates down to the present, some of the brightest minds the world has produced have devoted themselves to the study of its cure and prevention. The question of its cure has not yet been satisfactorily solved, but that of its prevention has been made as clear as any problem in mathematics. We know positively that the propagation of the disease germ depends upon the contamination of the well by the sick. We know also that this contamination can only take place in a certain way, namely through the medium of broken-down tubercular tissue, We know further, that the disease germ can very readily be destroyed in this broken-down tissue before it is able to reach a new host, and that if this is done the propagation of the disease will be stopped. The question of the prevention of tuberculosis, therefore, resolves itself into a question of how the broken-down tubercular tissue given off by hundreds of thousands of persons and animals, laboring under the disease, can be destroyed before it has an opportunity of reaching and infecting others. The practical solution of this question can only be accomplished by the government.

In most of the European governments, in harmony with their political institutions, there are National Boards of Health with many dependent subordinate boards, to which is entrusted the care for the health of the people. Under our American form of government this system is not practicable, but we could have United States and State Boards of Health, which would act in harmony, and to each of which certain duties would naturally fall. There is no more reason why we should not have such Boards of Health, than there is, why we should not have United States and State Courts. We have State Boards of Health in most of the States, but we have none in the United States. Not only should we have a Department of Health in the United States, but it should be made compulsory on every State to have such a department. The contract between the people and the government cannot and will not be carried out until the machinery for such departments has been constructed and put into operation.

The duties which would fall to a United States Department of Health in the prevention of tuberculosis, and which cannot be performed by a State Department, are the prevention of the importation of the disease from foreign countries and the carrying of it from State to State by commerce and travel. No immigrants should be allowed to enter our parts who are suffering from tuberculosis. Where such have been carried it should be seen that the ship which has carried them is properly disinfected, or at least that our own people be warned against travelling in that ship unless it is so disinfected. A thorough system of disinfection should be practiced under the supervision of the United States, on the coast vessels playing between north and south, all of which carry a large number of consumptives. All interstate railway travel should be kept under surveillence by the United States' Government, and railway companies should be compelled to provide a complete system of disinfection of all apartments occupied by persons suffering from tuberculosis. The transportation of tuberculous animals or tuberculous meat should be entirely prohibited.

In addition to these duties for the prevention of tuberculosis, which are incumbent upon the United States, because they cannot be performed by the States, there are others in which the Federal Government is co-sharer with the State Government. The Constitution of the United States gives Congress power to "lay and collect taxes, duties, impost, and excises, to pay debts and provide for the common defense, and general welfare of the United States;" . . . Under the power thus given the United States maintains an army and navy, and marine hospital service, army and navy hospitals, and educational institutions for the training of soldiers and sailors. Under the same power it could and ought to maintain a department of health, hospitals for the isolation and treatment of tuberculosis, and scientific institutions in which the disease could be studied and men given a practical training in methods of prevention. Our people have as much right to be protected against a disease which is known to be preventable as against a foreign foe.

To the State falls the lion's share of the duty in the prevention of tuberculosis. Every State in the Union should have a Department of Health, with subordinate Departments in every county of

the State. It ought to be the duty of this body to keep a record of every case of tuberculosis in the State, and of every movement of such case. Physicians ought, therefore, to be required to report every case of tuberculosis immediately upon discovery. When a case has been reported a competent officer of the State should at once be sent to the family to instruct them how to protect themselves against the disease. If they are too poor to supply themselves with the necessary means of self-protection, such means should be supplied to them, or they should be induced to remove the sick member to a special hospital for treatment. In order that sufficient opportunity be given for the tuberculous poor to be properly treated for the disease, the State ought to maintain well equipped special hospitals in various parts of the State of convenient access. Whenever a case of tuberculosis removes from a house, or dies, the State should at once, before the house can be occupied by another, thoroughly disinfect every part of it, scrape and replaster the room which was occupied by the patient, and take precautions that none of the clothing or furniture which had been used by the patient be given away or left for the use of others without first having been thoroughly disinfected. A house thus cleansed should be so recorded in the office of the department, so that any one wishing to move into it may be able to first assure himself that he runs no risk.[1] The State should also forbid and restrain the sale of food contaminated with the disease germ of tuberculosis. All slaughter houses and dairies should be inspected by competent men, and all tuberculous meat, and tuberculous milk-cows be condemned and redeemed by the State. No persons suffering from tuberculosis should be allowed to follow any avocation, in which he can contaminate the food, the implements or the wearing apparel of another. To obviate any hardships, every person suffering from tuberculosis, who is compelled to support a family, or who has anyone depending upon him, should for the time being become a pensioner of the State to the amount of his wages. Inasmuch as he gives up his earnings for the good of the public, it is but just and proper that he be supported as well as those depending upon him, at the expense of the public. I know that this will be cried down as expensive, and by some even as useless. That it would be expensive I admit; but I cannot help but feel that our present knowledge of tuberculosis will satisfy every one who will take the trouble to study the question, and whose mind is not preoccupied by a pet theory of his own, that such preventative measures would wipe out the disease.

As regards the expense, the Government, both Federal and State, is not only justified, but is bound, by the very contract upon which it is based, to protect the people against preventable disease. All the purposes for which government is constituted may be briefly summed up under *life and its continuation for the allotted length of time without endangerment by violence or disease.* Every act of rational man is unconsciously tinted by a motive for unmolested existence. Our very physical construction is framed with this in view. Nature lets us suffer pain to indicate to us that life or limb is in danger. We have feelings of well being to show that all is right. All happiness, indeed, is dependent upon a feeling of security against danger to life for its existence. We seek to be at liberty, because we fear that restraint may prejudice our existence or that of those who are dear to us, or may place us in a position where at some time or at another we might not be able to protect ourselves or them. We seek to possess property in order that we can always supply the wants of Nature to ourselves and those dependent upon us, and that we and they can refrain from exertions when our bodies need rest. In short the pursuit of happiness may be tersely defined as the chase of the foes of life. The question of expense can, therefore, hardly be allowed to be brought forward as an argument against any preventive measures against tuberculosis. Whatever the expense might be, however, it would certainly be very small as compared to what would be saved to the people by an avoidance of the disease, even though the question of the preservation of life were left out. The return for the expenditure in the way of individual and public prosperity would amply compensate for the outlay.

It is estimated that one hundred thousand people die annually from tuberculosis in the United States.[2] It is well known that the largest number of victims are taken during the first half of ordinary life. Making a due allowance for the number who, being saved from tuberculosis, might fall a victim to accident or some non-preventable disease, it would, I think, be a fair estimate to assume that the average number of years of usefulness lost by each of these one hundred thousand people is ten years. We then lose every year by tuberculosis the earning capacity of one million people for one year, which, put down in dollars and cents, at the low estimate of an average earning capacity for each individual of three hundred dollars a year, would amount to three hundred million dollars. Tuberculosis is, moreover, usually a chronic disease, and of long duration. At a very low estimate, the average length of time for which a tuberculous patient is incapacitated for work before death, may be placed at six months, during which time the earning capacity of one other member of the

[1] For this thought I am indebted to my friend, J. V. P. Turner, Registrar of the Philadelphia Board of Health.

[2] Address on Phthisis Pulmonalis by Wm. M. Collum, M.D., Journal American Medical Association, vol. xvi, page 361.

family is at least crippled because of nursing and care required by the sick one. In this way the earning capacity of from fifty to a hundred thousand people more, for one year, is sacrificed and lost to public wealth. To the loss of time must be added the expenses incidental to sickness, which, if they averaged but fifty dollars for each sick person, would amount to five million dollars a year. It will be very apparent to every one that I have placed all my estimates too low; but even with these low estimates, the annual loss to the public wealth of the United States because of the existence of tuberculosis will reach close on to five hundred million dollars. The expenditure of one-fifth of that amount by the federal and State governments for the extermination of the disease, would completely wipe out the disease in a single generation.

I am fully aware that there are men in the medical profession, and prominent men, too, who still hold that tuberculosis is not a preventable disease, and who cry down any preventative measures on the part of the government as a useless waste of public money. If there is any doubt on the part of the government on this question, it is certainly its duty to appoint a commission to carefully examine into the question and clear up the doubt one way or another. Either tuberculosis is a preventable disease or it is not. If it is a preventable disease, the government is in duty bound to prevent it, just as much as it is bound to protect its citizens against war. The finger of science points to the fact that tuberculosis is a preventable disease. Can our government afford to wait until every skeptic in the land has been convinced that it is preventable? No; its duty begins in the very beginning, with the scientific research into the preventability of the disease, and does not end until its citizens can walk this noble land for three score and ten years, unmolested in health, life and limb by aught that can be brought under the domain and control of man.

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THE DISINFECTION OF EXCRETA.

Read in the Section on State Medicine at the Forty-second Annual Meeting of the American Medical Association, held at Washington, D. C., May, 1891.

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The Committee on Disinfectants appointed by the American Public Health Association in 1884, in its final report submitted in 1887, gives the following *general directions:*

Disinfection of Excreta, etc. The infectious character of the dejections of patients suffering from cholera and from typhoid fever is well established, and this is true of mild cases and of the earliest stages of these diseases as well as of severe and fatal cases. It is probable that epidemic dysentery, tuberculosis, and perhaps diphtheria, yellow fever, scarlet fever, and typhus fever, may also be transmitted by means of the alvine discharges of the sick. It is, therefore, of the first importance that these should be disinfected. In cholera, diphtheria, yellow fever, and scarlet fever, all vomited material should also be looked upon as infectious. And in tuberculosis, diphtheria, scarlet fever, and infectious pneumonia, the sputa of the sick should be disinfected or destroyed by fire. It seems advisable also to treat the urine of patients sick with an infectious disease with one of the disinfecting solutions below recommended.

Chloride of lime, or bleaching powder, is perhaps entitled to the first place for disinfecting excreta, on account of the rapidity of its action.

The following standard solution is recommended:

Dissolve chloride of lime of the best quality,[1] *in pure water, in the proportion of six ounces to the gallon.* Use one quart of this solution for the disinfection of each discharge in cholera, typhoid fever, etc.[2] Mix well and leave in the vessel for at least one hour before throwing into privy vault or water closet.

The same directions apply to the disinfection of vomited matters. Infected sputum should be discharged directly into a cup half full of the solution. A five per cent. solution of carbolic acid may be used instead of the chloride of lime solution, the time of exposure to the action of the disinfectant being four hours." (Op. cit., pp. 237, 238).

The object of this paper is to inquire whether these recommendations, which were based upon the experimental data available at the time they were made, are sustained by subsequent investigations; and whether any other agents have been shown to possess superior advantages for the purpose in view.

But first we desire to call attention to another portion of the report of the Committee on Disinfectants. On page 236 the following definition of disinfection and disinfectants is given:

"The object of disinfection is to prevent the extension of infectious diseases by destroying the specific infectious material which gives rise to them. This is accomplished by the use of disinfectants. There can be no partial disinfection of such material; either its infecting power is destroyed or it is not. In the latter case there is a failure to disinfect. *Nor can there be any disinfection in the absence af infectious material.*"

[1] Good chloride of lime should contain at least 25 per cent. of available chlorine (page 92). It may be purchased by the quantity at 3½ cents per pound. The cost of the standard solution recommended is therefore but little more than a cent a gallon. A clear solution may be obtained by filtration or by decantation, but the insoluble sediment does no harm and this is an unnecessary refinement.

[2] For a very copious discharge use a larger quantity.

I have italicised the last sentence because I wish to call especial attention to it. I am frequently asked "what is the best disinfectant to put into a water closet." Now if a closet or privy vault is resorted to only by healthy persons and no infectious material has been thrown into it there is nothing in it to disinfect, and the recommendation of the Committee on Disinfectants does not apply to it at all. It may smell badly, and in this case the bad odor may be neutralized by the use of deodorants; or we may prevent the putrefactive decomposition of its contents and thus prevent the formation of the offensive gases given off as a result of such decomposition, by the use of antiseptics. But to accomplish this it is not necessary to sterilize the entire contents by the use of active germicide agents.

A solution of sulphate of iron or of chloride of zinc is an useful antiseptic and deodorizing agent, and the Committee on Disinfectants in making its recommendations did not intend to discourage the use of such agents. But exact experimental data showed that these agents could not be depended upon for the destruction of infectious disease germs, and the recommendations made related to disinfection in the strict and proper use of the term as above defined. This definition is now accepted by sanitarians in all parts of the world, but many practicing physicians still use the term disinfectant as synonymous with deodorant. For example, I find in a recent sanitary periodical under the heading "Medical Excerpt," an item copied from the *American Journal of Obstetrics*, to which the name of a distinguished gynecologist is attached, in which the following statement is made with reference to a much-advertised so-called "disinfectant." "As a disinfectant I have used it in my house for over a year with great satisfaction." Now the agent referred to has been proved by exact experiments to have comparatively little disinfecting power, although it is a very good deodorant. According to our definition "the object of disinfection is to prevent the extension of infectious diseases by destroying the specific infectious material which gives rise to them." Are we to suppose that the distinguished gynecologist above quoted had such infectious material in his house "for over a year" at the time he was employing "with great satisfaction" the agent he recommends? If not, the term was improperly employed for "there can be no disinfection in the absence of infectious material." I wish to emphasize this point because I have reason to believe that, in the army at least, the recommendation of the Committee on Disinfectants has led to the substitution of chloride of lime for cheaper deodorants and antiseptic agents —and especially for sulphate of iron—in latrines which are frequented only by healthy persons and consequently need no disinfection. The amount of chloride of lime issued from the Medical Purveying Depot at San Francisco during the past six months for use at military posts on the Pacific Coast, is more than double the amount of sulphate of iron; but there has been no epidemic of an infectious disease, and probably comparatively little call for the use of a disinfecting agent in the sick room. We quote again from the report of the Committee on Disinfectants:

"In the sick-room we have disease germs at an advantage, for we know where to find them as well as how to kill them. Having this knowledge, not to apply it would be criminal negligence, for our efforts to restrict the extension of infectious diseases must depend largely upon the proper use of disinfectants in the sick-room." (Op. cit , p. 237).

"The injurious consequences which are likely to result from such misapprehension and misuse of the word disinfectant will be appreciated when it is known that recent researches have demonstrated that many of the agents which have been found useful as deodorizers or as antiseptics, are entirely without value for the destruction of disease germs.

"This is true, for example, as regards the sulphate of iron or copperas, a salt which has been extensively used with the idea that it is a valuable disinfectant. As a matter of fact, sulphate of iron in saturated solution does not destroy the vitality of disease germs, or the infecting power of material containing them. This salt is, nevertheless, a very valuable antiseptic, and its low price makes it one of the most available agents for the arrest of putrefactive decomposition." (Op. cit., p. 237).

Chloride of lime is also a valuable antiseptic and deodorant, and I know of no objection to substituting it for sulphate of iron other than the question of cost. The first cost of chloride of lime, by the quantity, is about double that of sulphate of iron, but practically the difference is much greater because it is necessary to preserve the chloride of lime in air-tight packages. When exposed to the air it deteriorates in value very rapidly. It is therefore necessary to pack it in air-tight receptacles, which will not be injured by the corrosive action of free chlorine, and in comparatively small quantities, so that the contents of a package may be used soon after it is opened.

We now proceed to consider the experimental data relating to the germicide value of *chloride of lime.*

The Committee on Disinfectants gave it "the first place for disinfecting excreta on account of the rapidity of its action." This recommendation was upon experimental data obtained in the pathological laboratory of the Johns Hopkins University, under the writer's direction, and is sustained by more recent experiments made in Germany.

The experiments of Bolton, made for the Com-

mittee on Disinfectants in 1886, gave the following results: The time of exposure being two hours the typhoid bacillus and cholera spirillum in bouillon cultures were killed by a solution containing one part to 1000 parts of water (containing 0.03 per cent. of available chlorine). Anthrax spores were killed in the same time by a solution, containing 0.3 per cent. of available chlorine. Typhoid fæces were sterilized by a two per cent. solution, and in several instances by a one-half per cent. solution, but some resistant spores of non-pathogenic bacilli survived in two experiments in which a solution of 1:100 was used. In bouillon cultures to which 10 per cent. of dried egg albumen had been added, the typhoid bacillus was destroyed one-half per cent. (1:200).

Nissen, whose experiments were made in Koch's laboratory in 1890, found that anthrax spores were destroyed in thirty minutes by a 5 per cent. solution, and in 70 minutes by a 1 per cent. solution. In his experiments the typhoid bacillus and the cholera spirillum were destroyed with certainty in five minutes by a solution containing 0.12 per cent. (1:833); the anthrax bacillus in one minute by 1:1000; staphylococcus pyogenes aureus in one minute by 1:500. Experiments made by the same author on the sterilization of fæces showed that 1 per cent. could be relied upon to destroy the bacillus of typhoid fever and the spirillum of cholera in fæces in ten minutes.

Carbolic Acid.—The Committee on Disinfectants says: "A five per cent. solution of carbolic acid may be used instead of the chloride of lime solution, the time of exposure to the action of the disinfectant being four hours." This recommendation is made in view of the fact that in those diseases in which it is most important to disinfect the excreta, the specific germ does not form spores. This is now believed to be true of the typhoid bacillus, the spirillum of cholera, the bacillus of diphtheria, the bacillus of glanders, and the streptococcus of erysipelas; and it has been shown by exact experiments that all of these pathogenic bacteria are destroyed in two hours by a one per cent. solution, orless, of this agent.

Spores require for their destruction a stronger solution and a longer time. Koch found a one per cent. solution to be without effect on anthrax spores after fifteen days exposure; a two per cent. solution retarded their development, but did not destroy their vitality in seven days; a three per cent. solution was effective in two days. According to Nocht, at a temperature of 37.50 C., anthrax spores are killed by a five per cent solution in three hours.

Carbolic acid possesses the advantage of not being neutralized by the substances found in excreta, or by the presence of albumen. Thus Bolton found that the addition of 10 per cent. of dried albumen to a bouillon culture of the typhoid bacillus did not materially influence the result, the bacillus being destroyed in two hours by a one per cent. solution.

This agent, then, is firmly established as a valuable disinfectant for excreta, but we still give the preference to the standard solution of chloride of lime of the Committee on Disinfectants for use in the sick room, "on account of the rapidity of its action," and also on account of its comparative cheapness.

At the International Sanitary Conference of Rome (1885) the writer, who was associated with Dr. Koch on the Committee on Disinfectants, presented the claims of chloride of lime, and in the recommendations of the committee it was placed beside carbolic acid with the following direction:

"Carbolic acid and chloride of lime are to be used in aqueous solution.

"Weak solutions, carbolic acid 2 per cent.; chloride of lime 1 per cent.

"Strong solutions, carbolic acid, 5 per cent.; chloride of lime, 4 per cent."

The strong solutions were to be used for the disinfection of excreta.

Creolin, a coal tar product, which is a syrupy dark brown fluid with the odor of tar, has during the past three years received much attention from the German bacteriologists. It is probably the same product which was tested under the writer's direction for the Committee on Disinfectants, in 1885, under the name of "Little's soluble phenyle." It stood at the head of the "Commercial Disinfectants" tested. The experiments made in Germany show that it is not so active for spores as carbolic acid, but that it very promptly kills known pathogenic bacteria, in the absence of spores, in solutions of 2 per cent. or less. Eisenberg found that a solution of two per cent. killed all test organisms within 15 minutes. Esmarch found it especially fatal to the cholera spirillum, which was killed by solutions of 1:1000 in ten minutes. The typhoid bacillus showed much greater resisting power—a one-half per cent. solution failed after ten minutes exposure. The pus cocci were still more resistant. Behring has shown that the presence of albumen greatly diminishes its germicide power. As a deodorant it is superior to carbolic acid, and on this account is to be preferred in the sick room. A recently prepared emulsion may be used to disinfect the liquid execreta of cholera or typhoid patients, in the proportion of four per cent., two hours time being allowed for the action of the disinfectant. The experiments of Jaeger upon pure cultures of the tubercle bacillus attached to silk threads were successful in destroying the infecting power of these cultures, as tested by inoculation into the anterior chamber of the eye of a rabbit, when solutions of 2 per cent. were used.

The value of this agent as a disinfectant is then fully established; as to its cost in compar-

ison with the agents heretofore mentioned I am not informed.

Quick Lime.—Experiments made in Koch's laboratory in 1887 by Liboriws led him to place a high value upon recently burned quick lime as a disinfectant. More recent experiments by Jaeger, Kitisato, Pfuhl, and others have shown that this agent has considerable germicide power, in the absence of spores, and that the value which has long been placed upon it for the treatment of excrementitious material in latrines, etc., and as a wash for exposed surfaces, is justified by the results of exact experiments made upon known pathogenic bacteria. The germicide power of lime is not interfered with by the presence of albuminous material, but is neutralized by phosphates, carbonates and other bases, and by carbonic acid.

In the writer's experiments a saturated aqueous solution of calcium oxide failed to kill typhoid bacilli; but when suspended in water in the proportion of 1:40 by weight this bacillus was killed at the end of two hours. Anthrax spores were not killed in the same time by a lime wash containing 20 per cent. by weight of pure calcium oxide. According to Kitisato the typhoid bacillus and the cholera spirillum in bouillon cultures are destroyed by the addition of 0.1 per cent. of calcium oxide. Pfuhl experimented upon sterilized fæces to which pure cultures of the typhoid bacillus, or cholera spirillum were added. The liquid discharges of patients with typhoid fever or diarrhœa were used for the purpose. He found that sterilization was effected at the end of two hours by adding fragments of calcium hydrate in the proportion of 6 per cent., and that 3 per cent. was effective in six hours. When a milk of lime was used which could be thoroughly mixed with the dejecta the result was still more favorable. A standard preparation of milk of lime containing 20 per cent. of calcium hydrate killed the typhoid bacillus and the cholera spirillum in one hour when added to liquid fæces in the proportion of 2 per cent.

The experiments with this agent show that time is an important factor and that much longer exposures, as well as stronger solutions, are required to destroy pathogenic bacteria, than is the case with chloride of lime. For this reason we still give the last named agent the preference for the disinfection of excreta in the sick room. But in latrines the time required to accomplish disinfection is of less importance, and *we are disposed to give recently burned quick lime the first place for the disinfection of excreta in privy vaults, or on the surface of the ground.* It may be applied in the form of milk of lime, prepared by adding gradually eight parts, by weight, of water to one part of calcium hydrate. This must be freshly prepared, or protected from the air to prevent the formation of the inactive carbonate of lime.

According to Behring lime has about the same germicide value as the other caustic alkalies, and destroys the cholera spirillum and the bacillus of typhoid fever, of diphtheria, and of glanders, after several hours exposure, in the proportion of 50 cc. *normal-bauge* per litre. Wood ashes of lye of the same alkaline strength may therefore be substituted for quick lime.

Finally, it must not be forgotten that we have a ready means of disinfecting excreta in the sick-room, or its vicinity, by the application of heat. Exact experiments made by the writer and others show that the thermal death-point of the following pathogenic bacteria, and of the kinds of virus mentioned is below 60° C. (140° F.): Spirillum of cholera, bacillus of anthrax, bacillus of typhoid fever, bacillus of diphtheria, bacillus of glanders, diplococcus of pneumonia (M. Pasteuri), streptococcus of erysipelas, staphylococci of pus, micrococcus of gonorrhœa, vaccine virus, sheep pox virus, hydrophobia virus. Ten minutes exposure to the temperature mentioned may be relied upon for the disinfection of material containing any of these pathogenic organisms—except the anthrax bacillus when in the stage of spore formation. The use, therefore, *of boiling water in the proportion of three or four parts to one part of the material to be disinfected* may be safely recommended for such material. Or better still, a 10 per cent. solution of sulphate of iron or of chloride of zinc, at the boiling point, may be used in the same way (three parts to one). This will have a higher boiling point than water, and will serve at the same time as a deodorant. During an epidemic of cholera or typhoid fever such a solution might be kept boiling in a proper receptacle in the vicinity of the hospital wards containing patients, and would serve to conveniently, promptly, and cheaply disinfect all excreta.

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THE SANITARY AND UNSANITARY RELATIONS OF UNDERGROUND WATERS.

Read in the Section of State Medicine, at the Forty-second Annual Meeting of the American Medical Association, held at Washington, D. C., May, 1891.

BY S. H. BRYCE, M.D.,
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Gentlemen:—It is not my intention to deal at any length with this subject, but rather to present some of the principles to be observed in the selection of drinking-waters.

Much has been said with regard to the dangers of drinking water from wells; but it has not been until recently that the differentiation has been made as regards wells that are dangerous and those that are healthy.

As a general principle, it may be said that practically all *really* underground waters are sanitarily good; but it must be clearly understood what is meant by an underground water. For instance:

1. A water lying in a shallow dug out in prairie or bog land, down only to the impervious clay or rock below, cannot fairly be called underground water.

2. Neither can a well down even into a true water-bearing stratum of sand or gravel, be called an underground water, if the water of the upper organic soil layer is allowed to percolate toward the well laterally, without really moving downward through the underlying beds of clay loam, sand or gravel, which serve to sterilize the waters in their passage downward.

3. Neither can a well be called underground if, as is commonly the case, the well is covered with loose boards, or a wooden framework, thereby allowing the filth washings from the surface of the boards to be carried down through cracks into the water of the well.

Carl Fraenkel and others have carefully examined into the water of pit-wells, and such have by Pflügge been called "hygienic monsters"

Clearly, then, underground waters mean those which have primarily fallen upon the surface, have there been contaminated with soil microbes, but which have, in their passage downward, through percolation to the water-bearing zone situated on some impervious stratum, been purified by the several natural agencies which are at work.

Of these, doubtless, the one of greatest importance is the mechanical retention in the upper layers, of the grosser organic matters, for instance those of sewage on a sewage farm.

I have found that at a sewage farm, the upper circle or two of the bed of sand has retained practically all suspended organic matters, and that even soluble organic matters are gradually abstracted by capillary adhesion from waters as they pass downward.

In addition, however, to this cleansing action of capillarity, we have at work, under favoring conditions, the destructive action of bacteria. With various kinds of organic matters, putrefaction bacteria deal largely, but their work, while purifying to the soil, may result in emanations of an extremely injurious character. In order that this decomposition may go on rapidly and without pernicious results, intermittency of deposit of organic matter on the surface and the penetration of air with its oxygen into the soil is required, in order that the nitrifying germ, proper, may carry on its beneficent work.

Manifestly, therefore, we have in towns conditions where, with the permanent presence of masses of organic matter in back-yards and in privies, waters may move laterally or from the surface, carrying to the largest extent their solubility admits of, organic materials to underground strata, which, appearing in wells, and there coming into contact with oxygen, supply conditions for the free multiplication of germs borne in from the surface or the air, and hence waters that have been sterile as underground streams, and loaded with soluble organic matters, become culture media for certain pathogenic bacteria in those seasons of the year when the water temperature makes their development abundant. Every one is familiar with wells dangerous only in the later summer months when deep, or from spring or early summer, when their water reaches a higher temperature.

Much interest has for many years attached to the experiments of Pettenkofer with regard to the rising and falling of underground waters, in their bearing upon the increase in the mortality from filth diseases, notably of typhoid fever. It has been assumed that he was correct in saying that after a summer lowering of the ground water, and then a rise with autumn rains, typhoid invariably increased.

Now, with regard to this, as with so many other conditions, individual local circumstances will decide whether or not he is correct. For instance, Buck and Franklin have laid special stress on *wetness* of *soil* in general, and the effect of highness or lowness of the *subsoil water*, as increasing *cholera infantum*. Hirsch, on the other hand, examined the relationship between the number of cases of cholera infantum and the level of the subsoil water at Berlin, from 1877 to 1882, and concluded that the height of the subsoil water in Berlin gives no measure of the rate of mortality. Now if we look closely into the facts there, his conclusions are as we would expect. The city is

largely supplied with public water from the river sources, and naturally we find that during periods of high ground water, the rivers become increased in their volume, and instead of the drinking-water being more impure at such times, it would be less so.

But the case is different where well water is used. During the periods of dry weather, as the water in the superficial soil layers has gradually passed downward, it has been followed, according to the permeability of a soil, by atmospheric air, thereby extending the line of organic decompotion downward — this, however, being limited usually by the upper 4 or 5 feet.

What then takes place when heavy rains come? The first result is that the upper permeable bed, loaded with bacteria from free decomposition of organic matters, becomes saturated with moisture, while privies also, which have during the dry weather lost most of their fluid contents by evaporation, likewise become surcharged with moisture. The water from both these supersaturated sources moves along laterally downward toward the wells, as the lowest point, and loads them with soluble organic impurities, and with putrefactive and nitrifying bacteria; in addition to suspended impurities washed in from the surface. This causes disease, beyond question; but this is not due to the rise of ground water necessarily, since, as all know, the actual rise, in other than shallow subterranean water-streams and in springs, does not take place till weeks, or even months, after the spring or autumnal heavy rainfalls.

We, therefore, can see that the conditions governing the purity of water supplies from ponded streams and small lakes, are very different from those governing well waters, as in pit-wells. When the first are most foul, the latter are often least so.

The question, then, of the use of underground waters, is of a much wider nature than that relating merely to pit-wells in town and country.

Falling upon pervious upper soil and upland and cultivated fields, the rain forms those great reservoirs upon which river and lake supplies, as also that of ordinary wells, depends. Springs on the hillside are the index of their existence, and to these streams must we look for a pure water supply, obtained under conditions widely different from those we have just referred to.

Analyze these spring waters before contaminated by surface filth, drive an iron pipe down to this water-bearing stratum, and we find a water in all cases absolutely free from bacterial life, and those conditions which make pit-wells under ordinary conditions, such dangerous sources of supply.

As the rivers, in recent years, have been falling during the long summer, through the loss of the upland forests which formerly held back the water, and whose absence likewise creates long summer droughts, relieved at most by destructive thunder-storms, we have found ourselves depending upon ponded waters, becoming more impure by evaporation, lessening their amount, or upon rivers becoming more polluted by this lessened amount, together with increasing pollution by our growing towns. We are hence forced to turn our attention to these underground waters, sometimes, it is true, somewhat excessive in hardness, but always sterile, and supplying to artesian wells, driven wells, water-galleries of perforated pipes, and springs carefully collected and protected against surface poilution, while the utilization of such will do much to solve the questions both of water supply and sewage which, upon this rapidly populating continent, are to-day of more importance than probably all other health problems combined.

SECTION OF OPHTHALMOLOGY.

RECORD OF THE MEETINGS.

DR. LEARTUS CONNOR, Chairman.
DR. T. E. MURRELL, Secretary.

The sessions of this Section were held in the afternoon of May 5th, 6th and 7th, in the Medical Department of Georgetown University.

The chairman opened the first meeting with an address which contained very valuable suggestions in regard to promoting the interests of the Section. After the reading of this paper, upon motion, a committee of three was appointed to consider the suggestions in the Chairman's Address; the Chairman to be one of the committee.

The committee, consisting of Drs. Geo. E. Frothingham, Edward Jackson and Leartus Connor, reported on the second day as follows:

Gentlemen of the Ophthalmological Section, American Medical Association:

Your Committee, to whom was referred the Chairman's Address, begs leave to report upon his suggestions, by recommending the Section to adopt the following:

First, That the Section appoint an Executive Committee of three, whose general duties shall be to look after all matters pertaining to the development of the Section, not already in the hands of existing officers. When first appointed the members of this Committee shall serve for three, two and one years respectively, the yearly vacancy occurring thereafter shall be filled by the retiring chairman of the Section. Should other Sections appoint similar committees, it shall coöperate with them in all efforts to promote the interests of all Sections. It shall hold a yearly meeting, previous to the beginning of the sessions of the Section, at an exact date and place to be named by the Chairman of the Committee, and at such other times and places as the Committee may deem best for the promotion of the growth of the Section.

Second, That the Executive Committee be instructed to formulate and execute the plans needful for securing the re-publication from THE JOURNAL of the work of the Section, including papers with the discussions thereon, a complete list of all members of the Association who are active workers in ophthalmology, and such other facts as may be necessary for the completeness of the publica-

tion, as the names and addresses of the officers, names and addresses of the Executive Committee, a copy of this report, etc. It shall carefully edit the papers, discussions, list of members, etc., so that they may appear in correct form, when given to the public as the work of this Section. It shall finally secure such mechanical execution of the work as will render its appearance creditable to the Section.

Third, That the Executive Committee shall arrange for a Section dinner on the evening of the second day of the Annual meeting, at the usual dining hour of the place of meeting, at a price not to exceed two dollars, each member paying for his own ticket.

Fourth, It shall secure the names and addresses of all reputable ophthalmologists in North America, and use all reasonable measures to secure their coöperation in the work of the Section.

Signed, GEORGE E. FROTHINGHAM,
EDWARD JACKSON,
LEARTUS CONNER,
Committee.

On motion, this report was adopted unanimously, and the Chairman instructed to appoint the Committee. He named, in obedience to these instructions, the following as its members.

For three years, S. C. Ayres, 64 W. 7th St., Cincinnati, Ohio.

For two years, F. C. Hotz, 103 State St., Chicago, Ill.

For one year, Edward Jackson, 215 S. 17th St., Philadelphia, Pa.

S. C. Ayers being first appointed, was made Chairman of the Executive Committee.

On the afternoon of the second day, as fixed by the By-Laws, the Committee on nominations, consisting of Drs. F. C. Hotz, S. C. Ayers and J. J. Chisolm, reported the following officers for the ensuing year: Dr. J. L. Thompson of Indianapolis, Chairman; Dr. Geo. de Schweinitz of Philadelphia, Secretary.

Dr. S. C. Savage introduced the following resolution which was adopted.

Resolved, That the Section on Ophthalmology adopt the nomenclature introduced and applied to muscular insufficiencies by Dr. George T. Stevens.

Dr. Edward Jackson introduced the following resolution concerning the numbering of prisms, which was jointly agreed upon by himself, Dr. Swan M. Burnett and Dr. Alex Randall:

Resolved, That the Section on Ophthalmology of the American Medical Association, adopt and recommend as a standard or unit prism one which gives a deflection of one centimetre at the distance of one metre, and that this measurement may be taken on a plane up to No. 20. For higher numbers it is suggested that they be taken on the arc, or expressed in equivalent tangents. It also recommends to opticians and the profession for measurment the prismometer of Mr. C. F. Prentice.

The resolution was adoption by the Section.

Dr. Alex Randall exhibited the prismometer of Mr. Prentice.

Dr. S. C. Ayers exhibited a book he arranged for ophthalmologists entitled, "Oculist's Index Rerum." It is so arranged as to furnish a complete and handy index to every case in the case book according to classification. It will index twenty thousand cases, and is so simple and clear in arrangement as to be invaluable to any one who writes for publication the interesting cases in his practice, or compiles statistics. The book is published by J. H. Chambers & Co., of St. Louis.

At the conclusion of the programme the Chairman returned thanks to the members of the Section for their courteous bearing, and in turn, upon motion of Dr. Swan M. Burnett, a vote of thanks was tendered the Chairman and Secretary.

T. E. MURRELL, Secretary.

MEMBERS OF AMERICAN MEDICAL ASSOCIATION INTERESTED IN OPHTHALMOLOGY.

ARRANGED ALPHABETICALLY BY STATES.

Those marked by a * were present at the meeting.

Sanders, W. H., Mobile, Ala.
* Murrell, Thomas E., 111 E. 5th St., Little Rock, Ark.
* Moulton, H., Fort Smith, Ark.
Miller, R. W., Los Angeles, Cal.
Chase, John, 3 Barth Block, Denver, Col.
* Burnett, S. M., 1770 Mass. Ave., Washington, D. C.
Marmion, Wm. V., 1108 F., N. W., Washington, D. C.
* Richey, Stephen O., 732 17th, N. W., Washington, D. C.
Cotter, Robert O., Macon, Ga.
Bettmann, Boerne, 18 Central Music Hall, Chicago, Ill.
Colburn, J. Elliott, 126 State St., Chicago, Ill.
Dickinson, Fannie, 70 State St., Chicago, Ill.
Fiske, George F., Opera House Bldg, Chicago, Ill.
Gardiner, E. J., 126 State St., Chicago, Ill.
Gradle, Henry, Central Music Hall, Chicago, Ill.
Harper, John E., 163 State St., Chicago, Ill.
Holmes, Edward L., 112 Clark St., Chicago, Ill.
* Hotz, Ferdinand C., 103 State St., Chicago, Ill.
* Jones, Samuel J., 7 Jackson St., Chicago, Ill.
* Montgomery, Wm. T., Opera House Bldg, Chicago, Ill.
Prince, Arthur E., Jacksonville, Ill.
* Starkey, H. M., 70 State St., Chicago, Ill.
Tilley, Robert, 125 State St., Chicago, Ill.
Ware, Lyman, 125 State St., Chicago, Ill.
* Wescott, Cassius D., 567 W. Madison St., Chicago, Ill.
Blitz, Adolph, 22½ W. Washington St., Indianapolis, Ind.
Heath, F. C., Lafayette, Ind.
* Thompson, James L., 20 W. Ohio St., Indianapolis, Ind.
Dunlavy, J. C., Sioux City, Ia.
Hobby, C. M., Iowa City, Ia.
Young, H. B., Burlington, Ia.
* Minney, John E., Topeka, Kan.
Cheatham, Wm., 303 W. Chestnut St., Louisville, Ky.
Coomes, Martin F., 423 W. Chestnut St., Louisville, Ky.
Ray, J. Morrison, 419 W. Chestnut St., Louisville, Ky.
* Reynolds, Dudley S., cor. 3d and Chestnut Sts., Louisville, Ky.
Kennedy, Stirling D., 158 Canal St., New Orleans, La.
Hunt, David, 149 Boylston St., Boston, Mass.
Standish, Myles, 200 Dartmouth St., Boston, Mass.
Vermyne, J. J. B., 2 Orchard St., New Bedford, Mass.
Carrow, Fleming, Ann Arbor, Mich.
* Connor, Leartus, 103 Cass St., Detroit, Mich.
* Frothingham, George E., 702 Woodward Ave., Detroit, Mich.
Lundy, Charles J., 27 E. Adams Ave, Detroit, Mich.
Maire, Lewis E., 48 W. Adams Ave., Detroit, Mich.
Noyes, Jas. F., 16 Campau Bldg, Detroit, Mich.
* Smith, Eugene, 138 Lafayette Ave., Detroit, Mich.
Fulton, John F., 326 Wabasha St., St. Paul, Minn.
William, Cornelius, St. Paul, Minn.
Dickinson, Wm., 1322 Olive St., St. Louis, Mo.
* Pollack, S., St. Louis, Mo.
* Thompson, John H., 9th and Main Sts., Kansas City, Mo.

Tiffany, Flavel B., 13th and Grand Sts., Kansas City, Mo.
Tyree, Wm. C., 908 Wyandotte St., Kansas City, Mo.
*Chisolm, Julian J., 114 W. Franklin St., Baltimore, Md.
*Friedenwald, A., 310 N. Eutaw St. Baltimore, Md.
*Randolph, Robert E., 211 W. Madison St., Baltimore, Md.
*Bryant, D. C., Omaha, Neb.
Denise, Jacob C., Omaha, Neb.
Hepburne, Neil J., 399 W. 23d St., N. Y.
Mittendorf, Wm. F., 104 Madison Ave., New York, N. Y.
Noyes, Henry D., 233 Madison Ave, New York, N. Y.
*Stevens, Geo. T., 33 W. 33d St., New York, N. Y.
Allen, Harlan P., 73 State St., E. Columbus, Ohio.
*Ayres, Stephen C., 64 W. 7th St., Cincinnati, Ohio.
Baker, Albert R., 143 Euclid Ave., Cleveland, Ohio.
*Dowling, Francis, Cincinnati, O.
Buckner, Jas. H., 65 E. 4th St., Cincinnati, Ohio.
Holmes, C. R., 84 W. 7th St., Cincinnati, Ohio.
Larimore, F. C., Mt. Vernon, Ohio.
Sattler, Robert, 64 W. 7th St., Cincinnati, Ohio.
*Scott, Xenophon C., 127 Euclid Ave., Cleveland, Ohio.
*Smith, Daniel B., 20 Euclid Ave., Cleveland, Ohio.
Wright, John Wesley, 133 E. Spring St., Columbus, O.
*de Schweinitz, George E., 1401 Locust St., Philadelphia, Pa.
*Fenton, Thos. H., 1335 Arch St., Philadelphia, Pa.
Goodman, H. Earnest, 1509 Walnut St., Philadelphia, Pa.
*Gould, Geo. M., Philadelphia, Pa.
Heustis, Jas. W., 426 Pennsylvania Ave., Pittsburgh, Pa.
*Jackson, Edward, 215 S. 17th St, Philadelphia, Pa.
*Keyser, Peter D., 1832 Arch St., Philadelphia, Pa.
*Lautenbach, Louis J., 600 N. 6th St., Philadelphia, Pa.
Lippincott, J. A., 435 Pennsylvania Ave., Pittsburgh, Pa.
Morton, Thomas G., 1421 Chestnut St., Philadelphia, Pa.
Oliver, Chas A., 1507 Locust St., Philadelphia, Pa.
Perkins, Francis M., 1428 Pine St., Philadelphia, Pa.
*Randall, B. Alexander, 1806 Chestnut St., Philadelphia, Pa.
Roberts, John B., 1627 Walnut St., Philadelphia, Pa.
Steinbach, Lewis W., 716 Franklin St., Philadelphia, Pa.
Strawbridge, G., 1500 Walnut St., Philadelphia, Pa.
Taylor, Lewis H., 41 S. Franklin St., Wilkesbarre, Pa.
Turnbull, Chas. S., 1719 Chestnut St., Philadelphia, Pa.
Kollock, Chas. W., Charleston, S. C.
Herron, John T., Jackson, Tenn.
*Price, Geo. H., 519½ Church St., Nashville, Tenn.
*Savage, Giles C., 619½ Church St., Nashville, Tenn.
Sinclair, John G., Nashville, Tenn.
*Sinclair, Alexander G., 13 Masonic Temple, Memphis, Tenn.
Smith, Frank T., Chattanooga, Tenn.
Chilton, Robert H., Dallas, Texas.
Tyner, T. J., Austin, Texas.
White, Jos. A., 410 E. Grace St., Richmond, Va.
Thomson, R. L., Howard St., Spokane Falls, Wash.
Wuerdemann, H. V., Grand Ave., Milwaukee, Wis.

OTHER METHODS OF PROMOTING THE DEVELOPMENT OF THE SECTIONS.

Suggestions to the Section on Ophthalmology of the American Medical Association, at its meeting in Washington, D. C., May, 1891, by the Chairman,

LEARTUS CONNOR., A.M., M.D.,
OF DETROIT, MICH.

The future of the American Medical Association rests upon the works of its Sections. If this stands the test of criticism by intelligent medical men, then will the Association attract to its membership an increasingly large number of representative physicians from every portion of the American Continent.

The history of this Section is well known. From a membership of a dozen it has increased to over one hundred. From material insufficient for a few hours it has grown to a stage when its wealth of material taxes every energy for its profitable disposition during the longest obtainable sessions. Its career has been checkered by numerous disturbing and destructive forces, but having continued to develop in spite of these, and by their aid, it may confidently anticipate a future more useful to our science, more helpful to ourselves and more honorable to the profession. During the time allowed for remarks by your chairman, it were impossible to give an exhaustive account of the ophthalmological work accomplished during the past year. In general, we may say that no "epoch making discovery" has appeared, though every department exhibits important contributions. Some of these clear away obstructions, others add new facts, new principles and new processes. The true has been more firmly established, the doubtful rendered possible or certain, and some steps taken into the unknown.

The thirty-four papers presented at this meeting will unquestionably still further enrich our literature and render future work more satisfactory. I refrain from the discussion of any related topic in order that more time may be reserved for the reading and discussion of these papers. I am the more disposed to this course because I regard the position of chairman of this Section, as one calling for an undivided service to the interests of the entire Section. He is simply the servant of the Section. In this service I have learned numerous facts, from which I present certain suggestions:

First.—By rule of the Association, our papers and discussions are published in THE JOURNAL. This gives them a wide circulation among the profession and a permanent place in the volumes of THE JOURNAL. Some papers are reprinted at the expense of their authors and distributed among their ophthalmological friends. Thus, with a large and increasing circulation of THE JOURNAL, our contributions are disposed of in a profitable manner. But it has occurred to me that other useful purposes might be accomplished by an extension of their publication. To illustrate: The American Laryngological Society first publishes its papers and discussions in the *New York Medical Journal.* This being completed, they are republished in a separate form, as the transactions of this society. With these is printed a list of the members of the society, its rules and other important items of information. In like manner it is suggested that this Section arrange to have its papers and the discussions thereon, republished from THE JOURNAL, and with them printed an accurate list of all the members of the Association interested in

ophthalmology, and such other facts as would promote the interests of the Section. Such a republication would be a great convenience to us individually, and to all our fellow workers throughout the world. Life is short, its duties exacting and multiform, so that to be most valuable, work must be presented to busy men in a form readily accessible, else it will fail of the immediate accomplishment of its mission. The expense of this republication need not be great, and it is thought would be cheerfully met by such members as are interested in the development of the Section. The volumes also would have a limited sale that would partially meet the publication expenses. It seems clear that such an arrangement would attract other valuable workers into our ranks, and so augment the strength of the Section. In such a republication our work would stand out boldly as a unit, for the criticism of our colleagues. Individuals knowing that their papers were thus to receive added attention from experts, would be still more careful to prove their work several times ere bringing it before such a tribunal. Those having done work which they were confident would stand this added test, would gladly embrace the opportunity, and so our Section work would rise to progressively higher planes.

Were the Section to successfully inaugurate this change, others would follow, until each Section of the Association had its distinctive volume of transactions. Such a result must bring increased prosperity to both Association and Journal. The world at large estimates the Association, mainly, by what it sees of its Section work. THE JOURNAL stands or falls by the quality of the material sent it by the Sections. Hence of necessity, the backbone of both Association and Journal is constructed of the several Sections. THE JOURNAL has wonderfully aided the Sections and the proposed change must favorably increase this aid.

Second.—There should be made, subject to yearly revision, a list of all members of this Section. It should include all workers in this field who are members of the Association. Such a list would enable the members to know their fellow workers, and to exert such an influence as would secure from each his best work for this Section's meetings. Instead of being lost in a list of several thousand members, our fellows would have a distinctive individuality of their own. As already suggested, this list could be issued with the proposed volume of yearly transactions, and be compiled by the same publication committee. Such a list I have compiled, as completely as was possible, and present it to the Section for the use of the officers and the convenience of the fellows. All reputable physicians interested in ophthalmology can, by joining the American Medical Association, become members of this Section. If only the proper measures be adopted, it is possible that most reputable ophthalmologists in the United States will find membership in this body both profitable and pleasant to them.

Third.—Granting that the value of the Association meetings depends mainly upon the work of the Sections, it follows that the time given for Section work should be fully adequate for doing it in a perfectly satisfactory manner. There may be difference of opinion on this point, but it does not seem that less than six hours daily, will meet the present needs of this Section. When it becomes known that such a space of time is devoted to the reading and discussion of ophthalmological questions, these meetings will possess greater attraction to earnest students. They will see in attendance upon them adequate compensation for the fatigue of long journeys, the loss of private business and the corresponding diminution of income, the expenditure of considerable sums of money called for by such journeys and protracted absence from home. To secure larger attendance it must be shown that these meetings are worth more than the cost of time, of labor or of discomfort. The increase of the hours devoted to actual work as suggested would, I am certain, so increase the profit of these meetings as to outweigh the necessary cost, to a far larger number than at present. I am aware that the time devoted to the Section meetings is regulated by the Association, but it is certain that the agitation of the matter by earnest members of the Sections would meet a sympathetic response, and the problem be solved to the satisfaction of all.

Many thoughtful observers unite in the conviction that all interests would be best advanced by a very considerable shortening of the general sessions of the Association. They believe that most of the business and discussions of these sessions were better done by committees, and the time thus saved be given to the Sections. With six full working hours daily, free from all disturbing influences, the Sections would quite astonish both themselves and the Association, with the results they would attain—results helpful and uplifting to all members of the Sections, to the Association as a whole, to its Journal and to the profession at large.

Fourth.—Social commingling has its proper place. Each of us has felt the enlargement due to the personal contact with a fellow worker formerly known to us only by reputation. To have grasped his hand, to have looked into his face, to have listened to his voice, and to have been infected with his enthusiasm, has lifted us above our former plane and made better men of us, by the inspiration to do better work, in the future. Especially is this true, if the circumstances are favorable for the unbending of the severer men-

tal processes, and the outward expression of the heart qualities inherent in every true man. To promote this end in an increased degree, it is suggested that this Section dine together on the evening of the first day. It were better that the hour were the usual dining hour of the place of meeting. The price of the dinner tickets should be limited to a modest sum—say two dollars each, each individual paying for his own ticket. Doubtless, if this Section found the practice pleasant and profitable, other Sections would follow, until at last the entire Association, divided by groups according to their personal tastes, would dine together. An incidental advantage of this plan is the diminution of the labor and expense attending the entertainments given the Association, by the citizens of the cities visited.

Fifth.—in many ways it would facilitate the development of this Section, to have at its disposal a complete list of all reputable physicians practicing ophthalmology in North America. This Section desires the hearty coöperation of all such, but is unable to take all the steps needful to secure it, until it has ascertained their existence and location. In this view of the situation, the preparation of such a list was commenced. It was thought that the individuals upon this should be endorsed by one or more well-known ophthalmologists, and be either a member of a State Medical Society or eligible thereto. The first step in executing the plan was to secure the aid of some ophthalmological friends in making the first list of ophthalmologists. Fortunately, I was able to secure the list prepared last year by the former President of this Section and the Secretary, Drs. Ayres and Gardiner. This included about 125 names, located in every portion of the United States. A printed copy of this was sent to each gentleman upon the list, with the request that he make such additions to it as would enable it to include every reputable physician practicing ophthalmology. On their return these names were combined, and assorted alphabetically by States. Those in each State were sent to one or more well-known ophthalmologist in that State, for revision according to the plan stated. On the receipt of these revisions, a new complete list was made, and sent to such ophthalmologists as were known to be familiar with the profession of several adjacent States, for further correction. From the returns of these lists, a last one was made and sent to the Secretary of each State Medical Society, with the request that those names be erased who were not members of the State Society, and were ineligible, and that others be added, if members of the State Society or eligible thereto, and regarded as reputable ophthalmologists. The list for New York includes those recommended by both State Societies. For our purpose it was deemed best to ignore the difference between these bodies. We simply wanted a list of all reputable ophthalmologists, selected by competent judges. Should any person desire to eliminate those belonging to the old or the new Society, he can do so by comparing this list with that of either Society. It thus appeared that the process by which this list was constructed was tedious and complicated. The names on it have been placed there by one or more ophthalmologists, and further endorsed by the Secretary of the State Society in which the individual lives. The work was only possible through the coöperation of these numerous correspondents, and to each I publicly return my hearty thanks. Because of its incompleteness and probable errors, I have refrained from scattering it among our Fellows. If this Section, by a committee, desires to further perfect it, I shall be glad to render what assistance I may. If it regards it inexpedient so to do, I shall leave a copy with the officers of the Section, for their aid in the prosecution of their work, after I have made the final correction of the proofs, by aid of the members present.

Finally, I direct attention to the fact that so gradual has been their growth, that the Association has but partially modified its organic laws in accord with the character and importance of the Sections. Old customs by their very inertia have continued to exist when new ones are called for by the change of conditions. That the Section on ophthalmology may do its part toward making the needful changes, necessary to place the Association as a whole upon a platform in full accord with the conditions existing to day, I venture to suggest: 1. The appointment by the Section of an executive committee of three, to join with a similar committee from each of the other Sections (when said sections shall have appointed such a committee) in forming a Council of the Sections. The object of this council shall be, in general, to secure united action by the Sections upon all matters relating to their common interests, especially to secure such action as will promote their normal development. Among these may be mentioned: the republication from THE JOURNAL of the work of each Section with a list of its members; an increase in the amount of time devoted to Section work; a diminution of the time and work of the general sessions; and a promotion of the social intercourse of the members of each Section with each other. Doubtless other and more important questions would come before this Council. The principle, however, would be unchanged, viz., the desirability of such organization of the Sections as would enable them to plan such changes in the conduct of the affairs of the Association as they may, by study and consultation, find needful to ensure their most complete development. The future of the Association rests with the Sections. Is it not time for them to realize this responsibility and

intelligently move forward to meet it, in accord with the state of the medical profession as it exists to day?

If appointed this year, our executive committee could promote the formation of similar committees by the other sections, and so lead the way for the perfection of the Section Council. It could take the steps needed for the republication of our own transactions; it could arrange for a Section dinner; for the annual publication of a list of our own members; for an increase of time given to Section work. Other things doubtless it would find within its power by which it could advance the interests of this Section. As the most perfectly specialized department of medicine and surgery, it seems meet that it should take the first steps in the working out of a better future for not only itself but for the entire Association, including its Journal and the profession at large, a future in which the Association will attract to its membership every reputable physician practicing in North America, a future in which every department of the art and science of medicine shall be impelled forwards by the combined momentum of all to a degree hitherto unknown, a future in which our power shall be recognized in the laboratory, in the hospital, in the college, among the sick, and the unfortunate, but among the people as a whole as represented in legislative halls and by every intelligent individual throughout the land.

PHYSICAL CAUSES OF HEART DISEASE, AND TREATMENT.

Read before the Section of Internal Medicine, at the Tenth International Medical Congress, Berlin, 1890.

BY EPHRAIM CUTTER, A.M., M.D., LL.D.,
OF NEW YORK.
Corresponding Member Belgian and Italian Microscopical Societies; Member of American Society of Microscopists; President American Branch Society of Science, Letters and Art, of London.

Things that increase the work of the heart are physical causes of its diseases, as follows:

A. Hæmic. That is from the blood and its vessels, including the heart itself. *B. Trophopathic*—from the food, to-wit: gases, fermentation, fatty and fibrous degeneration, catarrhs. *C. Gynecologic*—from reflex uterine irritation. *D. Motio al*—as running, lifting heavy weights and climbing ascents. *E. Emotional*—as passions. *F. Postural. G. Heredity. H. Inflammatory*, etc., to name no more.

The limits allow only a brief discussion of the causes A, B, C and F. Perhaps it is best, as D, E, G and H are well understood.

We start with the idea that in health the heart can do its great work. We emphasize great, for we think few realize its greatness. It is great because, 1, unceasing; 2, of the weight of blood carried; 3, the distance carried; and 4, the microscopic smallness of the difference between the size of the capillaries and the average red corpuscles. All are familiar with the restless labor and the immense weight of blood the heart carries, so we will speak of 3 and 4. Some years ago a dentist of Boston, Dr. G. B. Harriman, said that the arteries, veins and capillaries in man, if able to be removed and connected with each other, would reach twice round the earth—that is, 48,000 miles. This was doubted, so he and I verified his statement by immersing our nude bodies in a bath-tub filled with water, and calculated the average displacement of an adult male weighing 150 lbs. to be 4,650 cubic inches. Next we calculated there would be 3,000 capillaries laid side by side in one square inch; in a cubic inch 9,000,000 capillaries one inch long, or in round numbers, 140 miles English.

On a very moderate basis, we thought we could reckon human bodies to be one-quarter capillaries. One thousand cubic inches of capillaries would give the enormous mileage of 142,000 miles, on a modest estimate, or nearly thrice the first estimate, which is overwhelming to the human intellect. But cut these figures down by other estimates, still they will not do away with the tremendous distance that the blood has to travel to do its work, and which should be borne in mind in the clinical estimates of heart disease. Suppose we come down to 1,000 miles as the estimate. It is work to circulate fluid through a tube 1,000 miles long. In health the heart does this work, but let there be added resistance from increased viscidity, and from changes in the walls of the vessels that make them rough and narrower, then think how much harder the heart has to work. The so-called "trip-hammer" beats of the heart have been found to occur where the circulation has been blocked by emboli, and are probably simply due to the heart's own efforts to propel the circulation normally.

The Heart an Autonomy.—That is to say, the heart governs the force and frequency of its pulsation very much like the governor of the steam engine—only the heart's governor lies in the ganglionic nerves that are situated in the base of the heart. They do not cerebrate like the nerve centres of the cerebrum, but they act in their way as the cerebral nerve centres act. I have had the heart beat regularly for twelve hours after entire removal from a mud turtle.

We think a careful study will sustain the autonomy of the heart as an independent nerve centre, but time forbids more explication here.

The clinical point here wished to be made, is that if the circulation is partially obstructed, whether from viscid blood or roughened vessels, the heart will have to beat harder to maintain the circulation, and thus become diseased by growing larger, as any muscle grows bigger by over-use, and if too long continued, atrophied, painful,

crampy from nervous prostration, as in writer's cramp.

The heart's work is great because there is little room for the blood corpuscles to flow through the capillaries.

What is the difference between $\frac{1}{3000}$ inch, the diameter of a capillary, and $\frac{1}{3200}$ inch, which is a little less than the average diameter of the red blood corpuscles. (It is not necessary to consider the white corpuscles, for they break up so easily into two, three, and even five segments, that they readily penetrate the capillaries.) Answer: $\frac{1}{48000}$. So that all the leeway the average red corpuscle has is less than $\frac{1}{48000}$ of an inch. A very small margin, and one liable to be used up because of its excessive microscopic minuteness. Let the blood become more viscid, or contain foreign bodies like those named, and how easy it must be to increase the work of the heart, and thus cause disease, as when the cardiac nerve centres find out there is obstruction, they use force to overcome it.

A. *Hæmic obstructions are:*

1. *In the blood.* 2. In the blood-*vessels.*

1. *In the Blood. The Morphology of the Blood in Rheumatism.*[1]

"*Red Corpuscles:* Color usually impaired, not always; coloring matter not so firmly held as in health. Are adhesive, sticky, often drawn out into elongated lozenge-shaped bodies with pointed ends, and sometimes filamentous, joining with one or more of their fellows. They clot in winrows, ridges and huddled masses; sometimes quite formless. This is caused by the massive fibrin filaments holding them fast, as it were, in their firm meshes. The same thing is seen in consumptive blood, but to a less degree.

"*White Corpuscles:* Usually enlarged, adhesive, sticking to each other and to the red corpuscles, and matters found in the serum. Indeed, it seems to be the office of the white corpuscles, so far as possible, to swallow and envelop any foreign substance that may find its way into the blood. Thus we find crystalline matters in the white blood corpuscles in rheumatism, though not always. They undergo amœboid movements as in healthy blood, they have independent locomotion. Disease does not seem to impair their automatic movements. Often they are increased in number. If there is fatty degeneration going on, they will be found to contain fat in globules.

"*The Serum. Fibrin Filaments.*—In massive, strong and sticky threads, in abundance—in meshes, which are finer than in health, visible plainly, strong, and hold the red corpuscles like prisoners—in skeins, like tangled skeins of silk—in masses forming thrombi which, when fastened, form emboli. These thrombi are apt to involve and embrace white and red corpuscles and crystalline bodies to be named below. Sometimes the fibrin filaments are found in large round strings, curled fancifully by the motion of the blood stream, and looking like the mycelial filaments of vegetations, from which they can be distinguished by an absence of entire cylindrical outline—ragged, broken edges here and there, and dichotomous and polychotomous divisions of the trunk, different from vegetations of syphilis, for example. It is the presence of these fibrin filaments that makes the blood ropy, adhesive and sticky. They have the tendency to block up the blood stream, and besides to be locally deposited in the tissues, specially when the circulation is sluggish, as near the extremities and the joints."

[1] See Clinical Morphologies, E. Cutter.

Crystalline Bodies, or Gravel of the Blood.—"These are numerons and readily recognized; some of them are as fol'ows: 1. Uric acid and urates of soda. 2. Phosphates—specially the triple phosphates of lime and soda. 3. Oxalate of lime. 4. Cystine. This is quite common and easily detected. 5. Carbonate of lime, rare. 6. Stelline and stellurine. These occur mostly in granular form in the serum, but in old cases, where the system is satnrated, they are crystalline. 7. Black, brown, aniline blue, bronze, orange, red and yellow pigments in the form of flakes or small masses are common in rheumatic blood, and may be termed gravelly matters that should have been eliminated by the kidneys or bowels, or skin.

"*Latent Condition of the Characteristics of Rheumatic Blood.*—The morphology of rheumatic blood exists in a latent condition in persons apparently well; but when they are exposed to cold, the blood-vessels contract, catch and detain these abnormal elements, and we have a stasis of the blood which may be active or passive, and manifests itself in heat, fever, pain, swelling, inflammation or passive congestion, effusion, etc., and which make up what is known as an 'attack of rheumatism.' The fever *may* result from the efforts of nature to get rid of the intruders, just as a householder will become hot in expelling from his premises a thief who is difficult to get rid of. Or, to use another simile, the attack of rheumatism is like the explosion of a gun. The charge in the gun is the morphology of rheumatic blood, and the cold is the pulling of the trigger. The charge may be latent in the gun for years, but it is there, with its potential energy ready to become actual from an exciting cause.

"*Fibræmia.*—In a nomenclature which was made before the present advance of knowledge, there is difficulty in making it fit to the new era. I shall not attempt to relieve this difficulty, but try to adapt the subject to the conventional names, as the object of this work is practical aid in treating diseases, no matter what they are called.

"*Fibræmia* is where the fibrin is in excess in filaments, skeins, curled massive fibres like strings, thrombi and emboli. These are in a more exaggerated condition and form than in consumption or rheumatism, and are not necessarily associated with the crystalline matters or gravel. Sometimes the fibres look like a scalp that has been taken from the head of a woman with long tresses of hair.

"*Thrombosis* is where masses of fibrin accrete and consolidate together, including or not the red corpuscles, white corpuscles, crystalline and pigmentary bodies, spores and mycelial filaments or vegetations, one or all.

"*Embolism* is where a thrombus has been caught or engaged in a blood vessel, and acts as a plug disturbing the circulation. When the embolus is made up of spores of mycoderma aceti or vinegar yeast, and is caught in the lung, it develops tubercle of the lungs, and so in other parts of the body. So senile gangrene of the extremities is caused by fibrinous clots plugging up an artery.

"*Pre-embolic State.*—As thrombi precede emboli, so they can be detected in the blood before the embolism, simply by the morphology of the blood. In this way, sudden deaths from embolism, specially in the puerperal state, can be averted, and this aid alone renders the microscope an invaluable assistant to the physician who is devoted to his profession."

2. HÆMIC OBSTRUCTION FROM THE CONDITION OF THE BLOOD VESSELS.

A. Fatty Degeneration—Atheroma—Ulceration and Roughening.—Atheroma is not always calcification. I have found it to be made up of crystals or plates of cholesterine in the aorta, thus proving a fatty degeneration caused by wrong feeding. In angina pectoris there are atheromatous deposits in the coronary arteries. May not the pain of angina pectoris come from a

colic or spasm of the partially paralyzed and fattily degenerated muscles, worn out by too much work in their weak state?

B. Trophopathic Increase of Heart Work.—In 1857, Dr. B. W. Richardson, of London, fed dogs on sugar chiefly, and found deposits in the blood stream and in the heart which he termed the essence of rheumatism.

1890. My son, Dr J. A. Cutter, and myself have found embolism in swine dying from hog cholera. Out of seventy swine, sixty died; so that feeding on vinegary foods may be set down as a cause of increasing the work of the heart by causing the morphology of rheumatic blood-atheroma, embolism and thrombosis. Food that produces carbonic acid, phosphuretted hydrogen, sulphuretted hydrogen or pure hydrogen causes a paralysis not only of the parts in contact with the gases of fermentation, but also by reflex, other organs, as for example the heart. The heart, paralyzed more or less completely, is overwhelmed, and fails to do its work. In America the newspapers term certain cases death from heart failure, showing, whether the cause of the failure is understood or not, that the great result is recognized. Gulping of wind from the stomach is often attended with death by the absorption of gases from the stomach. The mechanical pressure does not seem enough to cause instant death. Muscles partially paralyzed undergo fatty degeneration, which is a normal process in uterine subinvolution. Horses kept on high feed without proper exercise suffer muscular fatty degeneration, and become useless. Food used in excess containing carbo-hydrates or sugar produces fatty degeneration; so does phosphorus poisoning. A heart fed on starch and sugar is liable to fatty degeneration simply because the conversion of starch and sugar into fat is so easy chemically, and because of the paralyzing effects of carbonate acid gas in large excess. When a medical student, I once discharged a small stream of carbonic acid on the back of my hand. In a few minutes the spot was lead colored and insensible to prick and puncture. This occurred after the same stream had almost instantly killed a small snake in an empty glass jar.

Atheroma.—Although spoken of before, it should also have a place here, as it comes directly as a result of vegetable eating.

The morphology of rheumatism, fibræmia and consumption already alluded to, should come in here also, as they come directly from feeding of vegetable food that will ferment on it in a state of fermentation. The abnormal presence in blood of adhesive, sticky red blood corpuscles, massive fibrin filaments, single, aggregated in skeins, agglomerated in clots, free or mixed, including or not crystalline bodies, white blood or even red blood corpuscles, all are due to improper feeding as a general rule.

C. Gynic Causes of Heart Disease.—In my opinion, a large moity of functional cardiac disturbance in women comes from uterine disease. Pains, distress, palpitation, are in my experience often in causal relations with the uterus. I have thought it was because the diseased uterus used up more force than normal, and called on the organs to make up the deficiency; hence the heart suffers often from loss of its own constitutional force in this way. The reason why I think so is because I have seen, for many years, hearts relieved by curing the uterine lesion. Indeed I feel so sure of this that I always advise a gynic exploration in such cases, feeling that even if this position is correct, there is a great gain in stopping the uses of nerve force that leaks from uterine disorders of place and substance. For example, Dr. Bowditch, of Boston, sent a woman to me in consumption, complaining greatly of severe pain over the precordium, combined with violent action. I suspected uterine reflex, and found complete anteversion, with hyperæsthesia of the uterus. A few iodoform capsules relieved the hyperæsthesia and replacement relieved the anteversion; with this relief went the cardiac symptoms. Suppose the woman has organic disease of the heart, the gynic disease aggravates it often. I am quite aware that chest specialists may be, and are, surprised at this statement, as it rather clashes with the conventional idea of specialism that the specialist must not go out of his domain; but as the gynic causes are great factors in cardiac disease, neither they nor trophopathics should be neglected by the specialist, unless he wants to be a nonentity and failure. It is high time that all specialists recognize the gynic reflex and systemic causes of special disease. Ten years ago I called attention to the connection of the uterus and the throat, and was laughed at for my pains; now the idea is adopted.

F. Postural.—In persons compelled to stand erect, as American street car drivers. (In Europe they are more humane, and allow these workers to sit; may it be so in America!) Here the work of the heart is done against a pressure of blood column high as the head. The effect is seen in the varicose veins of the legs, and must increase the work of the heart. Indeed, I have seen the reports of drivers falling over the dasher, run over and killed. It is very probable that the falls would not have occurred unless the heart had given out in a faint. When we sit, the height of the blood column is diminished by the length of the thigh.

In the horizontal position the blood pressure is taken off, and only the flow of the blood is carried on.

But if the legs are elevated, then the weight of the blood is added to the direction of the stream, and eases the heart greatly, forming a most im-

portant element in rest. I have known a man with hypertrophy and valvular lesion, who could not sleep in bed for thirty minutes at night, when placed on a resting chair, in which the feet were gradually brought higher than the head, to get in two days so much rest to his diseased heart that he slept all night in bed. This shows what a work it is for the heart to beat when the body occupies erect postures.

TREATMENT.

A. Conventional is to sedate or quiet the heart by medicine and local treatment, with no view of any positive cure, only to make the patient more comfortable, and smooth the pathway to the tomb. While this may be desirable, is it doing all that can be done? And is this conventional treatment on the right principle? I think not; and my opinion is based on the facts just given, and, as a person whose parents both died of heart disease suddenly, I give here what I believe to be:

B. The Rational Treatment of Heart Disease, by removing causes, which are:

a, hæmic; *b*, trophopathic; *c*, gynic; *d*, motional; *e*, emotional; *f*, postural; *g*, hereditary, and *h*, inflammatory; *i*, oiling the machine with medicine, and nature, who is all the time trying to cure all disease, will then arrest and cure. It is not rational, when the heart is growing large because of its increased work, to tone down and quiet the heart, unless at the same time measures are taken to stop the causes of that very increased work.

The writer has seen so many cases where stopping the causes has been followed by permanent cures that he thinks this is the rational way to treat such cases.

a. Hæmic causes, treatment same as b. Trophophatic. (a) Remove causes; (b) build up the system on food which does not have the alcoholic or vinegar fermentation; (c) use medicines as aids, helps, assistants, but not with the view that they alone can cure.

(a) *Remove Causes;* that is, the vinegar plants, the thrombi clots, the stickiness of the corpuscles, the fibrin filaments in excess, as to size, strength and skeins. This is done by stopping the fermenting food.

(b) *Build up the System* on food which does not undergo the alcoholic or vinegar fermentation. Beef is digested in the stomach; digests easiest, quickest and assimilates best; feeds all the tissues well, and can be lived on for years, as hundreds have proved. Unchopped beef answers in some cases, but in those who have been physiologically erring for many years, even the white fibrous tissues of the unchopped meat ferments like the vegetable food, and great advantages come from removing this connective tissue fiber. The American and Enterprise chopper are the best for this purpose. The muscle pulp is moulded into cakes like fish-balls, broiled and seasoned with pepper, butter and salt, and eaten hot. (The cakes must not be moulded by hand, but with a knife and fork, so that the meat may not be too tightly pressed together; if it is, the meat will be livery and gelatinous, and apt to produce diarrhœa.) If properly prepared, it is palatable. No other food ere the fermentation ceases, except relishes of lemon juice and celery, the latter in small quantities, until the heart gets into getter shape. The moment the blood stream is normal, that moment the heart improves. The moment the paralyzing gases are removed and kept away, that moment the heart improves obviously. By the autonomy of the heart, or by the *vis mediatrix naturæ*, the heart is on the road to restoration by first stopping the accumulation of the thrombi; second, by their solution in the stream of normal blood; third, by their consequent disappearance by absorption; fourth, as our bodies change all the time, our hearts change with them, of course, and by stopping the causes of deterioration, and furnishing a supply of healthy food in abundance, the new structures of the heart are laid down normally.

(c) *Medicines are aids* and help to oil the machinery. For example: Some cases will get well on diet alone, but medicines are usually an aid.

They may be classed as follows:

1. *Hot water* at the temperature of tea and coffee, to be drank one or two hours before meals and on retiring to bed, in quantities of from one-half to one pint at each drinking.

This hot water promotes peristalsis downwards, washes out the digestive organs soured with swill, vinegar, etc., then the blood and secretions; washes out the kidneys, liver and skin, cleanses the foul system, causes eructation of paralyzing gases, *and can be used successfully when death seems imminent from heart failure.* The use of pure spring water is advised, or distilled water, as being free from organic life, and more able to dissolve out the crystaline bodies that are formed in the blood of thrombosis.

2. A good vegetable tonic of fluid extracts, such as are not poisonous, to be taken before meals to tone up the digestive organs. A combination of several ingredients works well in many cases. Strychnia, digitalis and strophanthus can be used to good effect, but as indicated by the special case.

3. Some non-sugary pepsin and pancreatine after meals to help digest the food is an excellent idea.

4. Ammonia or alcohol sponge-baths night and morning help, as the skin is the largest gland in the body, and does a great amount of excreting work. It is vicarious in function with the digestive organs, lungs, kidneys, etc. It must be kept in good trim.

5. Rubbing, massage and passive exercise, as

riding and driving, are excellent aids to help the machine run better.

c. *Gynic.*— Make local examinations, and, having found out the difficulty, treat accordingly. In passing, I might say that I have found great advantage in the use of, 1, vaginal gelatine capsules filled with iodoform or iodol, and retained by absorbent cotton; 2, iodoform or iodol in uterine cavity to relieve the hyperæsthesia—the best of anything if used with care; indeed, I would not know how to do without them; so far aristol and other chemicals have not superseded iodoformis sedating powders; 3, platinum-plated uterine sound, also good to relieve lesions of place. My own pessaries, specially the stem.

d. Motional.—When going up stairs, the force thrown on to the heart is four to ten times as much as when locomotion on a level at the same rate of speed. Hence patients, in going up stairs, should count four between each step, or even ten; this gives the heart good usage. I asked a mill owner what would be the result if suddenly he turned four times the usual work on to his 250-horse power steam engine. He said it would be broken. And yet this is done to the heart all the while, and worse still, as the rate of speed is usually more in going up stairs than on a level.

e. The Morale of the Patient Must be Cared for.—He must understand why he does as he does; that if he transgresses, his sin will find him out in the heightened color of his urine, in the gas in the stomach, the heart symptoms reappearing, and in a general fretful, fault-finding disposition with everything, which he will manifest. He should be cheerful and hopeful; make up his mind to get well, and then not worry, overwork or excite. Let the sympathetic nerves run unhindered. He should not live in his head. He should be very careful about exercise, remembering that the heart takes strength to get well, and to run the body in health. Tell him that it is work to live when sick, as it is more work to run a machine, a locomotive, pair of scissors, etc., when bearings need oiling, than when lubricated; hence, patients should take time and rest to get well. The physician should be in constant communication with the patient, and should often examine the blood, urine and fæces to know how the system is running, and to correct any mistake as soon as detected. He should inform the patient that he is on plans that must be studied. The physician must believe, and make the patient believe, in the truth of the plans. He should not hunt to find something that is going to kill the patient, but should look for things to cure. Nor should they make up their mind that the patient is going to die.

f. Postural.—Place patient on a chair that has the motions of the leg and thigh in vertical planes. The feet can be put higher than the head, and thus rest the heart. This acts well in practice.

g. Heredity.— These are best controlled by food plans for the benefit of posterity.

h. Inflammatory.— By posture, diet and depleting remedies, like veratrum.

Finally, the physician directs, the patient obeys, and nature effects the desired end — a healthy heart.

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VOMITING OF PREGNANCY; ITS ETIOLOGY AND TREATMENT.

Read before the Allegheny County Medical Society, June 16, 1891.

BY F. BLUME, M.D.,
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Pregnancy, as a rule, is complicated with a variety of disorders, which, though in many instances causing much discomfort, are termed physiological as long as they are not associated with serious disturbances of the organism. Derangements of the gastro-intestinal canal, nausea and vomiting, to the consideration of which I invite your attention to-night, are such a regular occurrence during the early period of pregnancy that experienced women consider them as positive signs of conception.

The so-called morning sickness — nausea and vomiting early in the morning, or even after meals, during the first few months of gestation— have, in the large majority of cases, no effect either upon the course of pregnancy or upon the health of women. Although the ordinary morning sickness sometimes persists during the whole period of pregnancy, it remains endurable, causing the patient rather annoyance than injury. There are intermissions, either spontaneously or the consequence of some treatment; the digestive functions remain more or less normal, and the vitality of the patient is not essentially impaired. In some, fortunately very rare instances, however, nausea and vomiting become incessant and uncontrollable, the stomach rejects everything, the patient grows weaker till the most extreme degree of exhaustion is reached, and death from starvation threatens.

The onset of this grave form of the affection is gradual, and does not differ in character from the usual morning sickness. But soon the nausea becomes more intense, the vomiting more frequent. The ejected matter consists of food, mucus and bile. The appetite is more or less impaired or perverted; the thirst is excessive; constipation is more frequent than diarrhœa; the urine is scanty, concentrated, and contains albumen and casts. The pulse grows small and rapid, the temperature rises, and continued fever develops.

With the progress of the disease the condition of the patient becomes more and more alarming. The nausea is almost constant, adding greatly to the discomfort of the woman. The efforts at vomiting are accompanied by violent retching and pain; not the smallest amount of food or drink is retained by the rebellious stomach; the smell, even the thought of nourishment, or the slightest movement of the patient, induces an attack. The vomited matter is finally mixed with blood. The thirst is tormenting, the throat and mouth are dry, the tongue brownish, the breath fetid, the abdomen tympanitic. The consequences of this continued suffering soon become very pronounced by the marked alteration of the features, the extreme emaciation and the profound depression of the patient. Shortly before life ends, vomiting ceases and coma supervenes.

Cases of persistent vomiting, which terminate fatally, are certainly very rare. Even after the application of various methods of treatment has failed to influence the course of the disease, and while the induction of abortion was earnestly considered, the patients have recovered spontaneously, and have gone to full term, as I have seen in the only instance of this grave disorder which has come under my observation.

There is considerable diversity of opinion as to the causes which may incite hyperemesis, and, in spite of numerous theories and hypotheses, the etiology of this disorder is by no means clear. It is almost universally accepted to be a reflex neurosis originating in the uterus, and dependent either upon pregnancy alone or upon co existent pathological conditions.

Pregnancy itself, the growing ovum, which acts as an irritant by the simple mechanical distension of the uterine cavity and its peritoneal covering, is in the first place to be mentioned as the most potent etiological factor.

Cases of multiple pregnancy and hydramnion, which present a disproportion between the passive distension and the active growth of the uterus, and which frequently are complicated with hyperemesis, confirm this view. Moreover, the induction of artificial abortion, our last resource in desperate cases, which almost immediately relieves the patient when done in time, is founded upon this theory of passive uterine distension, and strongly supports it.

Spontaneous death of the fœtus, followed by immediate or remote abortion, is another remarkable fact in favor of this view.

A patient of mine, the mother of two children, was suffering from double laceration of the cervix, erosion and endometritis. She refused surgical treatment, and was relieved by repeated irrigations of the uterus with carbolized water, and by the application of tincture of iodine. She soon afterward conceived, and her pregnancy was complicated with the ordinary morning-sickness from the second month to the beginning of the sixth, when the vomiting suddenly ceased. Two weeks thereafter she told me that she did no longer feel the movements of the fœtus, that vomiting had ceased, and that she therefore believed the child was dead. Though I could not detect the fœtal heart-sounds, I gave my opinion with reserve. Three and a half months later I delivered her of a dead fœtus about five months old.

This case affords the most striking evidence of the discontinuance of reflex symptoms after the removal of the inciting cause. We have here pregnancy complicated with pathological conditions of the uterus, as double laceration of the cervix, ectropium, and probably a but partially cured endometritis, conditions which existed prior to conception and continued after the death of the fœtus. But in spite of the persistence of these pathological conditions of the uterus, and of the retention of the dead fœtus for almost four months, the vomiting disappeared with the death of the fœtus, that is, with the cessation of the mechanical distension of the uterine cavity.

The influence of primary gravidity is demonstrated by the fact that hyperemesis in its grave forms is essentially an affection of primiparous women, and it is to be referred to the greater resistance of the virginal uterus.

Numerous other causes are given as etiological factors by different observers, among them: pathological conditions of the cervix, chronic metritis and endometritis, displacements of the uterus, inflammations of the pelvic peritoneum and connective tissue, ovarian neurosis, neurotic predisposition, hysteria, and lastly, diseases of the gastro-intestinal canal, especially gastric ulcer, chronic gastritis and constipation.

Morbid changes of the uterus are frequently the cause of reflex neuroses in non-pregnant women. The dependence of gastric disturbances upon the irritability of the uterine nerve-fibers, due to flexion and version of the uterus, to an eroded and congested cervix, to metritis and endometritis, has, in many instances, evidently been proven. Relief has been obtained by the removal of the exciting cause, by the treatment of the uterine diseases after gastric medication had been tried again and again and had failed entirely.

Bearing in mind the physiological changes of the uterus during the pregnant state, its increased functional activity, the influence exerted by gestation upon the nervous system, and the relation between the neuroses and the disorders of the reproductive organs, so often conclusively proven in non-gravid women, we are compelled to acknowledge the various pathological conditions of the uterus as prominent etiological factors deserving our earnest attention. Cases are on record where the application of caustics to

the eroded cervix, scarification of the congested vaginal portion, dilatation of the cervical canal, correction of a flexion, have proven successful in stopping the vomiting, and thus demonstrated the connection between the uterine lesion and the reflex nerve action. In other instances, however, the result of the gynecological treatment has not been so satisfactory, either transitory or no relief has been obtained, and, as a consequence, the influence of the uterine disorders upon the gastric phenomena, their importance as the causative diseases has been questioned.

Undoubtedly it will be often found difficult to decide whether the symptoms result from physiological or pathological causes; whether they are due to distension of the uterus or to morbid changes in the sexual organs. All methods of treatment, artificial abortion excepted, may fail to relieve the patient, and she finally may get well by absolute rest and complete abstinence, to the surprise of her medical attendant.

Such cases are certainly rare, while, on the other hand, there is abundant clinical evidence of the effect of local treatment. Numerous women have been benefited by the treatment of the uterine lesion; the reflex symptoms have been mitigated or cured by the improvement of the causative disease, and the connection between both has thereby been confirmed.

Attention has been drawn to the importance of endometritis as an etiological factor by F. Veit,[1] who reported three cases of uncontrollable vomiting, where he was compelled to interrupt pregnancy, and where he found inflammatory processes in the decidua, serotina and vera. Veit believes that by his researches the dependence of hyperemesis upon endometritis is positively proven, as a rule the endometritis exists prior to gestation, the symptoms are but insignificant, become palpable, however, with the beginning of pregnancy, which frequently is interrupted by this complication. In many instances the endometritis decidua will be found to be the cause of the uncontrollable vomiting; the connection through sympathetic paths must be the same as between gastric disorders and endometritis in non-gravid women. The evidence of an anatomical base, he continues, renders a most careful examination of the uterus imperative, and, if the diagnosis of endometritis, which is very difficult before the removal of the ovum, can be made out, it may be of determining influence as regards the advisability of inducing abortion.

Quite recently E. H. Grandin,[2] discussing this subject in the New York Obstetrical Society, suggested ovarian neurosis, pressure on unusually hyperesthetic ovaries as a cause of hyperemesis. This view, he says, would be suggested by Dr. Coe's case, which showed that the physiological vomiting of pregnancy could be palliated by teaching the patient to assume the genu-pectoral position before rising, and as often during the day as necessary. He would explain the vomiting of pregnancy, then, by the fact that during the early months the uterus lay low in the pelvis and pressed on the ovaries; at the third month, when the vomiting usually ceased, the uterus rose above the pelvic brim. In cases of pernicious vomiting it was possible the ovaries were either enlarged through disease or had become impacted between the pelvic brim and the lower uterine segment.

Grandin's theory, though it may be applicable to a given case, will probably not be favorably accepted. To-day the view is predominant that reflex neuroses may originate in the uterus, and not in the ovary. The removal of normal ovaries for the relief of reflex symptoms is at present restricted to exceptional cases, and it is believed that if a satisfactory result is obtained by the operation, this is due to the changes in the condition of the uterus, to the artificial induction of the menopause, resulting from oöphorectomy. Clinical evidence supports this view.

Grandin's explanation, however, may prove valuable in so far as to induce us to carefully examine the ovaries in cases of hyperemesis. Prolapsed ovaries are by no means a rare affection, but it remains to be demonstrated whether pressure exerted upon them by the enlarged uterus stands in causal relation to gastric disturbances.

Nervous disposition and hysteria, so frequently met with among women of the better classes, add greatly to the discomfort of pregnancy, and, though there are certainly many exceptions, must be considered as prominent predisposing factors of the graver forms of vomiting.

The importance of diseases of the gastro-intestinal canal, especially of gastric ulcers, is emphasized by various authors. According to Horwitz[3] "hyperemesis develops in some cases complicated with more or less pathological changes of the stomach and of the intestines. The greater the disturbance in the alimentary canal the easier the ordinary vomiting takes on the character of the uncontrollable form."

The diagnosis of vomiting of pregnancy is by no means as easy as one might think at first sight. While the dependence of this disorder upon the pregnant state may often be determined without much difficulty, cases—especially of the graver forms—may present themselves where this will be found impossible, and where the diagnosis, therefore, must remain doubtful. Faggard[4] directs our attention to the fact "that so few cases of pernicious vomiting are recorded in German medical literature that the existence of this affection is even questioned." Carl Braun, in a

[2] American Journal of Obstetrics, 1890, p. 1382.
[1] Berliner Clinische Wochenschrift, 1887, p. 643.

[3] Praktischer Arzt, 1882, p. 261.
[4] American System of Obstetrics, Vol. I, p. 411, 415.

fabulous experience of over one hundred and fifty thousand obstetrical cases, has never observed a single fatal termination. On the other hand, Robert Barnes has himself seen 9 fatal cases. McClintock collected close on 50 cases, and O. W. Doe 48 cases with 18 deaths occurring within the last fifteen years, and registered in American and English journals. Gueniot records 118 cases with 46 deaths.

It is not at all improbable, Faggard continues, that the difference of opinion as to the frequency of this disorder between the Germans on the one hand, and the American, French and English observers on the other, depends, in a large measure, upon the difference in diagnostic criteria insisted upon by the respective schools. In the majority of the fatal cases of alleged hyperemesis due to pregnancy reported by American, French and English observers, there is a notable absence of reliable records of post-mortem examinations. In the few cases collected by the Germans, on the other hand, the diagnosis during life has almost invariably been confirmed or negatived by exact investigation of the dead body. Horocks pertinently remarks: "Where there has been no post-mortem examination in a fatal case of vomiting, I do not think that one is entitled to say that pregnancy caused the fatal vomiting. It may have been the cause, and the only cause, or it may have been an aggravation of some other cause, or it may have had nothing to do with it. Skepticism as to the alleged frequency of this disorder, in the present state of our knowledge, is accordingly eminently in order."

According to Gueniot,[5] three distinct factors are to be taken into consideration in making the diagnosis of vomiting of pregnancy: 1. The diagnosis of pregnancy; 2. The diagnosis of the adjuvant or determining cause of the vomiting; 3. The differential diagnosis between obstinate vomiting due to pregnancy, and that due to other causes independent of gestation.

It is both interesting and instructive to learn that errors in diagnosis have been made even by eminent clinicians. Thus Faggard[6] tells us that Trousseau once diagnosticated uncontrollable vomiting, and induced abortion, in a case in which the autopsy revealed cancer of the stomach. Beau erred in diagnosis in a case in which the post-mortem examination showed tubercular meningitis as the probable cause of the vomiting, and Cazeaux narrates the history of a fatal case of alleged hyperemesis of pregnancy where the autopsy disclosed tubercular peritonitis and the absence of pregnancy.

But a mistake in diagnosis is possible even in the other direction—that is, pregnancy may be denied by the patient or not be expected by the physician, and thus be overlooked, as shown in a case recently reported by A. H. Buckmaster.[7] The patient, a governess in a respectable family, was supposed to be suffering from vomiting due to ulcer of the stomach, and was under treatment two months, when she died. In making the autopsy a five months' fœtus was found, but no ulcer whatever, nothing to account for death except the uncontrollable vomiting of pregnancy.

These cases need no comment. I have cited them to demonstrate both the difficulty and the importance of an accurate diagnosis.

It is generally stated that the prognosis of hyperemesis is bad, but this, apparently, is by no means correct. As Faggard justly remarks, "it is doubtful whether an authentic fatal case of this kind is recorded. Such cases have never been seen by observers of the largest experience."

Even the graver forms of this disease yield, as a rule, to rational treatment, unless they are complicated by serious pathological conditions which of themselves render recovery impossible. Pregnancy may aggravate such cases, and perhaps hasten death, but it must be admitted that there exists no causative relation between gestation and the lethal issue.

A great variety of remedies—still increasing in number every year—have been recommended by different writers. These remedies have proven satisfactory in some cases, but failed entirely in others. This uncertainty of the various methods of treatment, the often but little annoyance caused by the milder forms of vomiting, and the experience that in many instances spontaneous cures occur, have led to the view that interference is not required unless the case presents a more serious aspect. Such advice given in text-books is, at first sight, surprising. Even in mild cases of gastric trouble a careful examination is indicated, and should be insisted upon by the medical attendant, to determine the cause of the disorder, its dependence upon physiological or pathological conditions. Are the generative organs found to be normal? Are there no indications of diseases of other vital organs, especially of the stomach? Is the effect of the vomiting upon the general health but insignificant? It may then be decided whether it be a wise plan to irritate the stomach by various drugs, which, as known from experience, are of so limited value in this reflex affection, or to desist from treatment. It is in this sense, I take it, that such advice has been given, and it is under these circumstances that it deserves recommendation. Nevertheless, such statements in text-books are misleading, fortunately, but to the superficial reader.

While mild cases of vomiting do well without treatment, diet and regulation of the bowels are usually sufficient to render the gastric disturbances tolerable, but the persistent vomiting demands our earnest attention.

[5] Faggard, American System of Obstetrics, Vol. i, p. 416.
[6] Loc. cit.
[7] American Journal of Obstetrics, 1890, p. 1381.

Hyperemesis, a reflex neurosis, is either due to physiological changes in the uterus, distension by the growing ovum, or to pathological conditions complicating pregnancy. If we exclude co-existent diseases of the stomach, which will be considered later on, it must seem plausible that the treatment should be directed against the causes and not against the symptoms of the gastric disorder; that is, against the uterus, and not against the stomach. The stomach is not the diseased organ. Nausea and vomiting of pregnancy are only the symptoms of some functional disturbance of the nervous system, originating in the uterus, like the nausea and vomiting of sea-sickness, an analagous disease, dependent upon the motion of the ship. For this reason gastric medication must fail to favorably influence hyperemesis; for this reason none of the innumerable remedies recommended are found to be reliable—some of them are worse than useless.

There are three classes of cases, however, which sometimes may be relieved by the administration of drugs, viz.: 1. Women who, prior to gestation, have been afflicted with diseases of the stomach, as chronic gastritis and gastric ulcer; 2. Women of an unusual nervous irritability; and 3. Hysterical women.

In cases of the first category sub-nitrate of bismuth, bicarbonate of sodium, Carlsbad water, oxalate of cerium, the tincture of nux vomica, etc., may be tried and may sometimes be found of decided value, while the nervines and sedatives may give relief to nervous and hysterical women. Opium and its preparations, the bromides and chloral, either administered by the mouth, by the rectum, or hypodermically, as the circumstances require, are the medicinal agents which have the best reputation, and which, in these cases, sometimes successfully depress the reflex irritability, and thus alleviate the symptoms. Blisters, the application of chloroform, ether, and of the faradic current to the epigastrium, of the ice-bag to the dorso-lumbar region have been tried and have afforded relief in some instances.

The resort to local treatment is indicated in all those cases in which a morbid condition of the uterus has been made out. Retroflexion and retroversion are to be corrected, and, if necessary, the uterus is to be retained in position by a suitable pessary. A congested vaginal portion may be relieved by scarifications, while the application of carbolic acid, or of a 10 per cent. solution of nitrate of silver to the eroded cervix will often prove successful in mitigating the distressing symptoms. Faggard[8] states that in Vienna a 10 per cent. solution of nitrate of silver is employed in all cases of severe vomiting, irrespective of the condition of the vaginal portion. "The weight of testimony in favor of this simple procedure, collected from innumerable sources, is so great as to make its employment absolutely obligatory before resorting to more radical methods."

Dilatation of the cervix—Copeman's method—has proven successful according to some writers, while others report negative results. In the only case of severe vomiting which I have observed it had a most remarkable effect. The nausea disappeared instantly, but only for a few hours. The method was again applied, but no result was obtained the second time.

Horwitz[9] recommends that in the severer cases of vomiting the patient should be placed at rest in bed in the horizontal position, that the room be darkened, and that, if the stomach rejects everything, rectal alimentation should be resorted to. Crushed ice to quench the thirst is allowable. I can fully endorse this plan.

When these various methods have failed, when the vomiting actually is uncontrollable and seriously endangers the patient's life, the induction of abortion or premature labor is indicated, and will, if done in time, to a certainty save the woman.

[8] Loc. cit.

CONGRESS FOR THE STUDY OF TUBERCULOSIS.—On July 17, this Congress was inaugurated by a visit to Professor Lannelongue's wards at the Hôpital Trousseau, where the cases treated according to the new chloride of zinc method were passed in review. Later, the first meeting was held at the Faculty of Medicine, under the Presidency of the veteran Villemin. About 400 members were present to listen to addresses by Professors Verneuil, Grancher and Arloing. The latter inquirer gave experimental proof of the inefficiency in the laboratory of Koch's tuberculin. Meetings were held on the 28th, 29th, 30th and 31st, and visits were paid to Professor Verneuil's wards at the Hotel Dieu, where patients treated by injections of iodoformed ether were presented; to the Val-de-Grâce Military Hospital, to see the cases treated by creasoted oil; and to the Institut Pasteur. A grand banquet took place on Thursday evening. In connection with this subject, the *Progrès Médical* revives the question of the disinfection of railway carriages employed for the conveyance of phthisical visitors to the southern health resorts. Prausnitz is quoted as having examined the dust of *coupés* on the express train doing the service between Berlin and Meran—a route much frequented by consumptives. He inoculated this dust into guinea pigs according to the serial method of Cornet, and found that two out of five *coupés* contained the tuberculous bacillus. The journal above mentioned urges the Paris-Lyon-Mediterranée Compagnie to provide—at least for the better class of travelers—antiseptic spittoons. —*Boston Med. and Surg. Journal.*

[9] Loc cit.

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BY-LAW IV.—THE PUBLICATION OF PAPERS AND REPORTS.

No report or other paper shall be entitled to publication in the volume for the year in which it shall be presented to the Association, unless it be placed in the hands of the Board of Trustees on or before the first day of July. It must also be so prepared as to require no material alteration or addition at the hands of its author.

Authors of papers are required to return their proofs within two weeks after their reception; otherwise they will be passed over and omitted from the volume.

Every paper received by this Association and ordered to be published, and all plates or other means of illustration, shall be considered the exclusive property of the Association, and shall be published and sold for the exclusive benefit of the Association.

The Board of Trustees shall have full discretionary power to omit from the published *Transactions*, in part or in whole, any paper that may be referred to it by the Association, or either of the Sections, unless specially instructed to the contrary by vote of the Association.

LONDON OFFICE, 57 AND 59 LUDGATE HILL.

SATURDAY, AUGUST 22, 1891.

THE GERMS OF TYPHOID FEVER.

The lectures delivered at the post-graduate course at Toronto last winter, have reached us in pamphlet form. Among them is one by PROF. VICTOR C. VAUGHAN under the above caption. After reviewing the work which has been done by various investigators as to the presence of the KOCH-EBERTH germ in typhoid fever, and the attempts to inoculate lower animals with it, he sums up as follows:

1. A germ giving the tests supposed to be characteristic of the EBERTH germ is found invariably in the bodies of those dead from typhoid fever.

2. It has been isolated and grown in pure cultures.

3. All attempts to induce typhoid fever in the lower animals by inoculation with this germ have so far been without success.

4. Experiments show not only that the germ fails to multiply in the lower animals, but that, when introduced by inoculation, it soon dies.

The failure of the inoculation experiments may be due to insusceptibility on the part of the lower animals, or the germ employed may not be the cause of typhoid fever.

HUGUENIN, as quoted by MURCHISON, says that enteric fever with characteristic intestinal lesions is by no means uncommon among cattle in Switzerland. In 1882, BRAUTLECHT inoculated rabbits with germs from water supposed to be the cause of a typhoid epidemic, and produced in them a wasting febrile disorder lasting from two to eight weeks, with the post-mortem evidences of severe catarrh of the small intestine. The intestinal walls were thickened and friable, the mucous membrane swollen, yellowish, and reticulated; ulceration was present in some cases, but was generally confined to individual glands. There was marked enlargement and coloration of the spleen and mesenteric glands. In 1885, SEMMER reported typhoid fever in three dogs and a horse, in which the lesions were well marked. From this it would appear that the disease probably occurs in the lower animals, and the failure of the inoculation experiments cannot be explained by assuming the contrary.

VAUGHAN'S own work on the subject is of value, particularly as to the sufficiency of the identification of the KOCH-EBERTH bacillus. The KOCH-EBERTH germ is said to be identified by its resistance to stains and by its invisible growth on potato.

Two germs which VAUGHAN has frequently found in drinking water, and which he designates as bacillus A, and bacillus B, are under ordinary circumstances very readily distinguished from the KOCH-EBERTH germ. But VAUGHAN grew these germs on healthy human spleen, at temperatures of 39° C. to 40° C. (102.2° F. to 104° F.), and made cultures from them from time to time. After seven days bacillus A was so modified that its growth on potato could not be distinguished from that of the KOCH-EBERTH germ. And after fourteen days, it did not take stains even as deeply as the KOCH-EBERTH germ. Similar results were obtained from bacillus B.

RODET and ROUX in 1890 found that the bacterium coli commune when cultivated at a temperature of 44° C. to 46° C. acquired a close resemblance to EBERTH'S germ.

VAUGHAN concludes that we must abandon the belief that typhoid fever is due at all times to one and the same germ which can be recognized by certain peculiarities in staining or in manner of growth.

Whether this conclusion will be generally ad-

mitted or not, we must agree that the experiments of VAUGHAN and those of RODET and ROUX show that the characteristics by which it has been sought to recognize the Koch-Eberth germ, can be acquired by some other germs by exposure to continuous high temperature, that is to say, to fever temperature. These experiments do not show, however, that the germ originally described by EBERTH was not the cause of typhoid fever, although they throw doubt, in fact almost render valueless, observations relating to the germ, which have included as their means of recognition its peculiar growth on potato and its relation to staining agents.

It would seem also that it has not yet been shown beyond doubt that the lower animals are the subject of true enteric fever.

PANCREATIC DIGESTION OF FATS.

Last week we referred to the work of GAD and RACHFORD on the formation of spontaneous emulsions. They found that if a drop of oil containing 5½ per cent. of fatty acid was dropped upon a ¼ per cent. sodium carbonate solution, a spontaneous emulsion was formed. Using this method in the investigation of the pancreatic digestion of fats, RACHFORD discovered some very interesting and valuable facts. Discouraged by HEIDENHAIN'S attempts to make permanent pancreatic fistulæ in dogs, he made use of temporary fistulæ in rabbits, in this way always securing fresh juice for his experiments. The portion of the duodenum containing the end of the pancreatic duct was resected, brought to the surface of the abdomen, and the pure juice obtained through a glass canula inserted into the open end of the duct. Taking the pancreatic juice so obtained, it was shaken up with neutral olive oil for a moment, and then the two allowed to separate. A drop from the supernatant oil was then pipetted off and dropped upon a ¼ per cent. solution of sodium carbonate. This operation was repeated every three minutes until a perfect spontaneous emulsion was formed. As an average of his experiments, he found that about twenty minutes was required to form the perfect emulsion under these circumstances; or, in other words, the juice would produce 5½ per cent. of fatty acid in the oil in twenty minutes. These experiments were conducted at the ordinary temperature of the room, 18° C. (64.4 F.). When the mixture of the oil and juice was kept at the temperature of the body, the fat-splitting activity of the juice was doubled, and the 5½ per cent. of fatty acid was formed in about ten minutes. The emulsions formed in this way had all the peculiarities of the emulsions formed with neutral oil, to which a definite amount of fatty acid had been added, and sodium carbonate solution, to which we referred last week. The most important feature of his experiments, perhaps, was his determination of the influence which the other digestive agents had upon the fat-splitting properties of the pancreatic juice. Representing the activity of the juice at room temperature by 20, the addition of dilute hydrochloric acid was found to reduce this activity to 13, while the addition of the principal constituent of the bile, viz., the glycocholate of soda, increased it to 44. When the glycocholate of soda and hydrochloric acid were both added, the activity was still further increased, being represented by 56. That the other ingredients of the bile were not unimportant in this connection was shown by the fact that the juice and bile alone had an activity of 64. The greatest effect, however, was obtained by a mixture of pancreatic juice, bile and hydrochloric acid, the activity of the mixture being 80, or four times that of the pancreatic juice alone.

RACHFORD'S experiments show very clearly that the bile does not assist in the emulsification of fats as has been so long taught, but, on the contrary, directly interferes with the emulsification, while it does assist powerfully in decomposing the fats into glycerine and fatty acids.

It has been the custom of late to study the digestive ferments separately, in order to obtain so-called accurate information, but these experiments certainly indicate that the combined action of these ferments may give strikingly different results from what their separate actions would indicate.

BEQUESTS TO HOSPITALS.—Under wills recently probated the following institutions obtain liberal gifts: The Grady Memorial Hospital, of Atlanta, Ga., receives $7,500 from the estate of the late William A. Moore, and the Rhode Island Hospital, at Providence, $80,000, as a legacy of the late J. Wilson Smith.

THE COLLAPSE OF FATHER MALLINGER.

It is reported that FATHER MALLINGER, the alleged faith-healing priest of Troy Hill, Pittsburg, has been enabled to lay up earthly treasure to the amount of $3,000,000. The Pittsburg papers have apparently found a satisfactory explanation for the Father's erratic course in the fact that he has a good knowledge of the healing art, having regularly graduated in medicine in Germany, and having been a country practitioner before the time of his entering holy orders. He gives medicines in many cases and the patients are bidden to send to him to have them renewed. The nature of his materia medica has not been made known.

In regard to the *fiasco* which occurred on St. Anthony's day, there can be little doubt that lives were lost rather than saved, as the unfortunate pilgrims to Mount Troy were led to believe and hope would be the case. Several deaths were reported as having occurred very soon after that day, probably caused by the excitement and resultant depression naturally following the pilgrimages of many from a distance, and undue mental and physical strain. Many of these hopeful pilgrims were of the poorest classes, and spent their little all in this final grand effort to obtain a cure, so that many of them must have been made worse by their journeyings, even if they did not die by the way. The newspaper reporters, who did so much to raise the senseless and sensational expectations of the unfortunates, have of late been engaged in ferreting out the alleged marvelous "cures" and in demonstrating that most of the cured persons "are still far from being well."

ORTHOPÆDIC SURGERY DEFINED.

In the twenty-third annual report of the New York Orthopædic Dispensary, DR. NEWTON M. SHAFFER offers the following comprehensive definition of the province of orthopædic surgery: "It is that department of surgery which includes the prevention, the mechanical treatment and the operative treatment of chronic or progressive deformities, for the proper treatment of which special forms of apparatus or special mechanical dressings are necessary." The underlying thought which dictates the above definition implies that the fully qualified orthopædist shall be prepared to do surgical operations in that range of cases where special mechanical measures must be employed after those operations, but the operative treatment must stand in a position secondary to the mechanical; and the conservative element is seen in the union of the two treatments. Those deformities which general surgery is competent to relieve at once, or without the intervention of mechanico-therapy, are excepted under the foregoing definition.

MARION-SIMS MEDICAL COLLEGE IS IN LINE.—At a recent meeting of the Faculty of the Marion-Sims College of Medicine, the Dean, Dr. Young H. Bond, introduced the following resolutions, which were unanimously adopted:

WHEREAS, The position taken by this college upon the two questions of Medical Legislation and Medical Education, has been intentionally confounded, and

WHEREAS, Notwithstanding the fact that, at the last meeting of the Missouri State Medical Association, the report on Medical Education offered by Dr. McAlester, and having as its central idea a three years' graded course of lectures, was, on motion of your Dean, with the aid of the votes of all the members of this Faculty then present, adopted, it has been sought to have it appear that this college is not favorable to higher Medical Education. Therefore, to the end that our position upon the question of Medical Education be clearly understood, be it

Resolved, That after the session of 1891–'92, the Marion-Sims College of Medicine will exact as a condition to graduation in medicine, of all its students who may not have previously matriculated, attendance upon a graded course of lectures extending over three years. And be it further

Resolved, That our position upon the question of Medical Education does not in the least abate or compromise our objection to what we regard as the attempted enactment of unjust, inefficient and class Medical Legislation, and that this Faculty favors an Examining Board as the fair and rational solution of the problem of Medical Legislation and Medical Education as well.

MARINE-HOSPITAL SERVICE.—A board of surgeons for the examination of candidates for admission into the Marine-Hospital Service will be convened at the United States Marine-Hospital, St. Louis, Mo., October 12, 1891.

Candidates for examination should make application to the Surgeon-General U. S. Marine-Hospital Service, Washington, D. C., as early as practicable, and should enclose testimonials from at least two reputable citizens, preferably physicians, as to their professional and moral char-

acter. No person will be considered eligible for examination, whose age is less than 21, or more than 30 years, or who suffers from any physical defect which would be liable to impair his efficiency or incapacitate him from duty. The candidate must be a graduate of a medical college of good standing, as evidence of which his diploma should be submitted to the board.

DOMESTIC CORRESPONDENCE.

LETTER FROM NEW YORK.

(FROM OUR OWN CORRESPONDENT.)

The impression has for some time been prevalent, that the various private hospitals in the city have been rather too much given to the practice of transferring dying patients to Bellevue Hospital, with a view to keeping down their own death-rate to as low a point as possible, without regard to the bad showing that the records of Bellevue would consequently make. A case in point was published in the newspapers last spring, where an old negro was found lying in the street in an unconscious condition on the lower part of University Place. An ambulance was summoned from St. Vincent's Hospital, which was quite near at hand; but the ambulance surgeon, after examining the man, and finding him to be in a dying condition, took him to Bellevue Hospital, more than a mile and a half distant, instead of to his own hospital.

In commenting on this case, the warden of Bellevue remarked that it was only one out of many instances of inhumanity on the part of the private hospitals for the purpose of keeping down their death-rates. It was the plain duty of the ambulance surgeon, he said, to take the patient to the nearest hospital, and although he was very likely past medical aid, the long ride on the rough pavement to Bellevue certainly did not improve his chances of living. "We are powerless," continued the warden, "because most of the hospitals are classed as private, although they receive money from the city. These hospitals unload everything at Bellevue that looks like death, and the death-rate here makes it look like a slaughter house. After dark, every night, there is a string of ambulances from all the hospitals in town passing through the gates of Bellevue, carrying dying patients. These have been treated at the hospitals until there was no chance left of curing the diseases from which they were suffering, and then the order was given to take them to the dead-house—meaning Bellevue. The doctors at the other hospitals laugh at us. Bellevue is a charity hospital belonging to the city, and we have to take all patients who are unable to pay their board."

If, however, we are to believe the report of a committee appointed by the Grand Jury to examine the condition of the ambulance service in the city and to make recommendations for improving its efficiency, which has just been made to the Court of General Sessions, it is not true that the private hospitals are in the habit of transferring patients to Bellevue for the purpose of diminishing their death-rates. Such transfers as are made, the committee is satisfied, are proper and necessary. It is certainly to be hoped that this is really the case. At all events, this report, which has been prepared by four gentlemen of intelligence and position, contains much that is interesting and valuable.

In regard to the private hospitals which have an ambulance department, they state that they found the ambulance equipment and service such as called for approval. The ambulance surgeons are all graduates in medicine, and no one is detailed for this service until after he has had six months' active duty in the hospital wards. These private hospitals are the New York Hospital, the Chambers Street Branch of the New York, the Roosevelt, St. Vincent's, the Presbyterian and the Manhattan, and they have altogether twelve ambulances. During the year 1890 St. Vincent's had 1,930 ambulance calls; the Manhattan, 567; the Presbyterian, 1,202; the Roosevelt, 1,530; the New York, 1,321; and the Chambers Street, 2,678. The public hospitals with ambulance service are Bellevue, its down-town branch, the Gouverneur, and its up-town branch, the Harlem; and they maintain ten ambulances. During the year 1890 Bellevue Hospital had 4,246 ambulance calls; the Gouverneur, 2,374; and the Harlem, 1,225.

In its report the committee urges the Commissioners of Charities and Correction to establish as promptly as possible a hospital at Fordham, in the portion of the city which was annexed from Westchester County, which has for some time been in contemplation, as it is highly desirable that the districts beyond the Harlem River should be thus provided. It also recommends the early establishment of a hospital, with ambulance service, on the west side of the city, at some point about midway between the Roosevelt Hospital, at 59th Street, and the Manhattan, at 131st Street. There was formerly a public reception hospital at 99th Street, but this was given up some time ago, and the population is increasing very rapidly in this quarter.

In criticising the present faulty system of sending calls for ambulances, the committee does not hesitate to pronounce it positively discreditable that the city is still without a comprehensive system of signal-boxes or stations distributed through the streets in large numbers, so that an ambulance can be summoned with the smallest possible delay. "While we find very much to commend regarding the response by all hospitals to ambulance calls upon them," says the report, "we are compelled to criticise very generally the present notification to the hospitals of the necessity for an ambulance at a location where some one may be suffering." Consequently, the committee urges upon the Police Commissioners the importance of at once selecting the most approved and perfect system available for rapid communication with station houses both for ambulance service and for police purposes; and it also asks the Board of Estimate and Apportionment to at once appropriate the money required for this object. In conclusion, it expresses the fear that the cable roads which are now being laid in many of the principal thoroughfares of the city will be likely

to cause an unusually large number of street accidents, especially during the first year that they are in use; and on this account particularly the committee feel that it is highly important that the various recommendations embodied in their report should receive the prompt attention of the proper authorities.

It having been very gratuitously announced by one of the morning papers that Dr. Louis A. Sayre had been obliged on account of ill health to resign his position as Professor of Orthopædic Surgery in Bellevue Hospital Medical College (which he has held ever since the school was founded), and also to retire from practice, the doctor has been obliged to come out in a letter in which he states that neither of these assertions are true, and that while he was confined to the house for a number of months by a very severe attack of rheumatism, he is now sufficiently well to attend to practice and to drive in the Park every fair day. Long indeed may the illustrious and noble-hearted surgeon be spared to the profession and to the city which his honored name has so highly adorned!

Miss Waterbury, a wealthy maiden lady who recently died in Brooklyn, has set an example worthy of emulation by leaving among her bequests the sum of $5,000 to her old and faithful family physician, and $3,000 to his daughter.

There has just sailed from this port, with a fair American bride, a real Egyptian Pasha, who is at the same time an English physician of distinction. His name is Crookshank, and while yet but a medical student he served with honor in the medical corps of the German army during the Franco-Prussian war. Later he was a surgeon in the Turko-Russian and Servian wars, and in 1883, when the cholera was raging in Egypt he went to Cairo, where his eminent services attracted the personal attention of the Khedive, who made him a Pasha and appointed him Director-General of Egyptian prisons, a position which he still holds. P. B. P.

Editor Jour. Am. Med. Assoc'n:—The college announcements of this summer prove that the discussions in past years regarding the improvement of medical education have had considerable effect. The usual directions in which changes for the better are made are in requiring more exact proofs of a good preliminary education, and in increasing the number of courses of college study. There is yet another simple method of securing increased efficiency in the graduates by adding one or two years to the minimum age for graduation. It would not be much of a hardship if it were the rule that the degree of M.D. should not be conferred on a student less than twenty-three years old. Most students are of this age when they graduate. This age is early enough to undertake the responsible duties of a medical practitioner, and the desiderated maturity of intellect, and preparatory literary education might be more certainly attained if students should not be allowed to begin a career of serious investigation when they are mere boys. MARY A. WHERY, M.D.

26 Madison St., Ft. Wayne, Ind.

Premature Rupture of Membranes not Followed by Miscarriage.

Editor Jour. Am. Med. Assoc'n:—I have just read Dr. Johnson's article in THE JOURNAL on "Premature Rupture of Membranes not Followed by Miscarriage," and would be glad to report two similar cases—not for the purpose of reporting them only, but to offer a different diagnosis, inasmuch as I think his diagnosis is misleading to the younger members of the profession. My first case, a multipara, white, aged 30 years, pregnancy advanced to the sixth month, had a flow of quite a quantity of fluid which I at the time supposed was amniotic, but the case went on to term without any further difficulty, and I concluded that I was wrong. Shortly after I met with another case, also a multipara, white, aged 28 years; pregnancy advanced to the seventh month. Here again was a large flow of fluid, resembling amniotic fluid, but nothing further developed, and the woman went on to term and was delivered of a healthy child.

Here, now, are two cases which the young practitioner might consider as premature rupture of the membranes, but in reality were nothing more than hydrorrhœa.

For a discussion of the subject I would refer the reader to Cyclopœdia of Obstetrics and Gynecology. By Charpentier. Vol. II, page 218. Also to the valuable works of Lusk and Playfair. S. P. DEAHOFE, M.D.

Mineral Point, Wis., August 17, 1891.

BOOK REVIEWS.

THE PATHOLOGY, DIAGNOSIS AND TREATMENT OF INTRA-CRANIAL GROWTHS. By PHILIP COOMBS KNAPP, A.M., M.D. Boston: Rockwell & Churchill. 1891. 8vo., cloth, pp. 161.

This book is the essay to which was awarded the Fiske Fund prize at the annual meeting of the Rhode Island Medical Society, held at Provdence, June 12, 1890.

The essay is based on the records of forty cases with necropsies, thirty-eight of which were patients at the Boston City Hospital.

There is a chapter each on Ætiology, Pathological Anatomy, General Symptomatology, Special Symptomatology, Diagnosis, Course Duration and Prognosis, and Treatment. There is a table of cases of removal of intra-cranial growths, and a list of references.

Examination of the book shows that as a record and commentary on the forty cases, it fulfils its mission, but it can by no means take the place of a systematic treatise on the subject. It cannot be favorably mentioned in comparison with Bramwell on Intra-Cranial Tumors, on account of its lack of system, and of thoroughness. It fails to mention the records of many accessible hospital reports, and the following statement is made on page 25: "In America they" (*parasitic* cysts) "are rare, and the hos-

pital records show very few cases of hydatid cysts anywhere in the body, and none in the brain." The author will find an "American" case of hydatids of the brain in the report of the Marine-Hospital Service for 1883, p. 220, and another in the same series of reports for the year 1888, p. 324. There are recorded in these reports 571,528 cases of disease, from 1873 up to 1890, and the total deaths recorded were 7,367, and the number of necropsies 1881 to 1890 were 1,913—out of this total the reports show but seventeen cases of intra-cranial tumors; six of the seventeen were gummata. These figures are given to indicate a source of information too frequently overlooked by medical statisticians, and to correct an error of the author. The reports of several American hospitals for the insane might also be consulted with advantage.

We commend the book, as a generally careful piece of work, and as giving in small space a fair review of the subject, and as such it will be welcome to the table of every neurologist and general surgeon.

A MANUAL OF MODERN SURGERY. AN EXPOSITION OF THE ACCEPTED DOCTRINES AND APPROVED OPERATIVE PROCEDURES OF THE PRESENT TIME, for the Use of Students and Practitioners. By JOHN B. ROBERTS, A.M., M.D., Professor of Surgery in the Woman's Medical College of Pennsylvania; Professor of Anatomy and Surgery in the Philadelphia Polyclinic; Lecturer in Anatomy in the University of Pennsylvania. With 501 Illustrations. Philadelphia: Lea Brothers & Co. 1890.

It is difficult to conceive in what manner more of practical instruction could be conveyed in the brief space of 770 pages, than is presented in this practical manual by Professor Roberts. A review of Part First, which is devoted to general surgery and pathology and the principles of surgery, clearly indicates that upon the essential points with reference to inflammatory processes, diseases of the blood, the modes of repair and the treatment of wounds, as well as in the details of operative surgery, the latest views upon these important subjects are well represented. Part Second of the volume contains some fifteen chapters which treat upon the surgery of special structures. The one upon diseases and injuries of the brain and spinal cord will well repay repeated perusal. So also of the one upon surgical diseases of the abdomen and pelvis. The proper methods of treating injuries of every sort are well described. By text and by ample illustrations selected from a variety of authors, as well as from original drawings, the methods of operating are clearly set forth, and its suggestions will be helpful both to students and practitioners. Much of value will be found relating to all the special departments of surgery, so that not only to students and to general practitioners, but as well to specialists, this work commends itself.

As a contribution to American medical literature it does credit to its author, while to the American profession, with which Dr. Roberts stands so pleasantly related, it proffers another valuable American contribution.

In its publication it bears evidence of the same good taste and liberal expenditure which has through long years been characteristic of the house from which it emanates.

TEXT-BOOK OF HYGIENE. A Comprehensive Treatise on the Principles and Practice of Preventive Medicine from an American Standpoint. By GEORGE H. ROHÉ, M.D., Professor of Obstetrics and Hygiene in the College of Physicians and Surgeons, Baltimore; Director of the Maryland Maternité; Member of American Public Health Association, etc. Second Edition, thoroughly Revised and largely Rewritten, with many Illustrations and valuable Tables. Philadelphia and London: F. A. Davis, Publishers. 1890.

The appreciation of this work is best shown by the fact that a second edition is so soon in demand. An opportunity is thus afforded for Professor Rohé to incorporate much valuable matter which has been gathered from the fields of preventive medicine, since the issue of the first edition. The second edition bears evidence of a very thorough revision. Over a hundred pages have been added to the text.

The first five chapters are devoted to the subjects of air, water, food, soil and sewage. The construction of houses and hospitals are next considered. Then follow chapters upon industrial, military and camp, naval and prison hygiene. Exercise and training are well considered. Bathing and clothing next receive attention. The methods for disposal of the dead form an important chapter. Later the germ theory of disease is discussed, and chapters follow upon contagion and infection. A valuable article upon quarantine, from the pen of Walter Wyman, M.D., Surgeon U. S. Marine-Hospital Service, concludes the volume.

Preventive medicine, more than at any other period in the world's history, now commands the thought and study of the medical profession.

This work by Professor Rohé is a valuable contribution to the literature upon this subject, and as an American work it is all the more acceptable to those of us who have a special pride in the development of American literature. The volume will be found exceedingly instructive, and will commend itself to a large class of persons who are interested in sanitary science, but who are not members of the medical profession. To such, as well as to medical men, we commend the work.

A MANUAL OF THE PRACTICE OF MEDICINE. By FREDERICK TAYLOR, M.D., F.R.C.P. Physician to, and Lecturer on Medicine at Guy's Hospital; Physician to the Evelina Hospital for sick children; Examiner in Materia Medica and Pharmaceutical Chemistry at the University of London. With Illustrations. Philadelphia: P. Blakiston, Son & Co., 1012 Walnut St. 1890.

This valuable practical work of eight hundred pages from the pen of the well-known English author, Professor Taylor, is well worthy of a place in the libraries of American Practitioners. It deals concisely with the nature, course and treatment of diseases. Specific infectious diseases are very fully described, and his methods of treatment are judicious.

He considers the diseases of the nervous system in general, and specifically in a manner helpful to the practitioner; his descriptions being lucid and yet concise, and their treatments such as promise the best results. The diseases of the digestive organs, those of respiration, and of the circulatory system are carefully described, and the directions for treatment will be found especially suggestive to those whose means of library references are limited. The leading varieties of skin disease are well considered and their treatment indicated. His section on urinary diseases will repay a careful reading. By this reproduction of an English work upon Medical Practice the publishers have conferred a benefit upon the American medical profession. Price $4.

A TREATISE ON MASSAGE. Theoretical and Practical; Its History, Mode of Application and Effects. Indications and Contra-Indications, with results of over fifteen hundred cases, by DOUGLAS GRAHAM, M.D. Second edition, Revised and enlarged. New York: J. H. Vail & Co.

In this revised edition of the author's work,—the first having appeared in 1874—is shown the same enthusiasm which characterized the first one. This serves a two-fold purpose. It inspires patients, for a time at least, with hopefulness, and stimulates the profession to further investigate its range and value as a therapeutic agent, both of which remain yet to be firmly established. Perhaps the author will have less occasion to complain of the want of familiarity of the medical profession with the subject of massage now than at the time his book first appeared.

Although the manipulations which now are known as massage were practiced, and with benefit, even prior to the Christian era, it is probable that at no time has the subject received more, if as much, attention than in the last decade. The comfort given by judicious practice of the art is not an inconsiderable matter in functional disturbances. If it can be established that it will, in other cases, do one-half of what is claimed for it by its enthusiastic advocates, it should find a more prominent and a lasting place among our remedial measures.

In addition to the physical aspect of the subject, in its practical work, it has become apparent that there is also a moral one. It is not necessary to condemn a worthy measure because it may be perverted. It is, however, to be regretted that, as massage is now being tested on its merits, and from a scientific standpoint, any occasion should have arisen that so-called massage establishments, in our cities, should have made it necessary to place them under police surveillance, in the interest of public morality.

This book, in the eighteen chapters into which it is divided, covers the supposed range of the usefulness of the art, and is a fair exponent of what may be regarded as an enthusiast's conviction, based upon experience—his own and others—in a great variety of cases. The results are, at least, suggestive, and the book is not devoid of interest, although it may not, always, convince. It may be but a typographical error that fixes the period of the war of the rebellion in the United States as being "from 1860 to 1864."

MISCELLANY.

A HINT.—Last week Messrs. John S. Christian and Frederick Reistorf, druggists of this city, were each fined $100 for practicing medicine without a license.

ERRATA.—IN THE JOURNAL of August 8, the article on the National Temperance Hospital was wrongly credited to Dr. J. Davis, instead of Dr. Chas. Gilbert Davis of Chicago.

MISSISSIPPI VALLEY MEDICAL ASSOCIATION.—This Association will hold its seventeenth annual session at the Pickwick Theatre, Washington and Jefferson aves., St. Louis, October 14, 15 and 16. A full programme of interesting papers has been prepared and provision has been made for the fullest, freest and most complete discussion of the same. Representative men from various sections of the country have been invited to open the discussions. The local profession of St. Louis is a unit to the end that every visiting physician shall be received and welcomed in a regular warm hearted, St. Louis style.

The same qualifications for membership in this Association are requisite as for the American Medical Association, the former being subordinate to the latter. If eligible, you and your friends, together with your wives and families, are most cordially invited to visit St. Louis and enter into the scientific work and the social pleasures as you may desire.

I. N. LOVE, Chairman Committee Arrangements.

AMERICAN GYNECOLOGICAL SOCIETY.—Programme of the Sixteenth Annual Meeting, to be held in the lecture room of the Columbian University, corner of 15th and H streets, Washington, D. C., on September 22, 23 and 24, 1891. Physicians are cordially invited to be present.

First Day—Tuesday, September 22.

Morning session at 9.30 o'clock. Roll-call, reception of guests, etc. Address of Welcome. By Dr. Joseph Taber Johnson, of Washington.

1. The Advantages of Mixed Anæsthesia in Gynecological Surgery. By Dr. John R. Reeve, of Dayton, Ohio.
2. Concealed Accidental Hæmorrhage During Labor. By Dr. Henry C. Coe, of New York.
3. Diffuse Adenoma of the Uterine Body. By Dr. James R. Chadwick, of Boston.
4. The Influence of Season on Recurrent Pelvic Inflammations. By Dr. Frank P. Foster, of New York.
5. The Therapeutic Aspect of Some Ovarian Disorders. By Dr. Edward W. Jenks, of Detroit.

Adjournment at 1 P.M. Afternoon Session at 2.30 o'clock.

6. Insanity Following Laparotomy. By Dr. J. M. Baldy, of Philadelphia.
7. Vaginal Hysterectomy by *Morcellement;* Technique and Indications for Operation. By Dr. Samuel Pozzi, of Paris, France.
8. A Clinical Study of Primary Carcinomatous and Sarcomatous Neoplasms between the Layers of the Broad Ligament, with Report of Cases. By Dr. Joseph E. Janvrin, of New York.
9. The Present and Improving Status of Cæsarian Surgery. By Dr. Robert P. Harris, of Philadelphia.
10. Unique Case of Multiple Neuro-lipomata following Laparotomy. By Dr. H. Marion Sims, of New York.

Second Day—Wednesday, September 23.

Morning Session at 9.30 o'clock.

11. President's Address.
12. The Treatment of Cancer of the Cervix Uteri by High Amputation; Second Series of Cases, with Additional Report on the First Series. By Dr. William H. Baker, of Boston.
13. The Advantages of Delivery in the Left Lateral Posture. By Dr. Henry J. Garrigues, of New York.
14. The influence of Imperfect Development as a Cause of Uterine Disease. By Dr. W. Gill Wylie, of New York.
15. The Technique of Vaginal Fixation of the Stump in Abdominal Hysterectomy. By Dr. Henry T. Byford, of Chicago.
16. Can We Avoid Mural Abscesses and Ventral Herniæ after Laparotomy? By Dr. Horace T. Hanks, of New York.

Adjournment at 1 P.M. Afternoon Session at 2.30 o'clock.

17. Some Clinical Testimony as to the Ultimate Results of Removal of the Uterine Appendages. By Dr. Thaddeus A. Reamy, of Cincinnati.
18. Indications for Abdominal Section in the Treatment of Puerperal Pelvic Inflammations. By Dr. R. B. Maury, Memphis, Tenn.
19. A Study Relative to the Functions of the Reproductive Organs in American Indian Women. By Dr. Andrew F. Currier, of New York.
20. The Immediate Closure of Laceration of the Cervix. By Dr. Cornelius Kollock, of Cheraw, S. C.
21. The Conservative Treatment of Pelvic Tumors and Diseases. By Dr. Eugene Gehrung, of St. Louis.
22. The Anatomical Relations of the Lacerated Perineum to the Mechanics of its Causation. By Dr. Edward Reynolds, of Boston.

Business meeting, with closed doors, at 8 P.M.

Third Day, Thursday, September 24th.

Morning session at 9.30 o'clock.

23. In Memoriam,—Dr. Fordyce Barker, by Dr. James R. Chadwick, of Boston.
24. Ureteritis in the Female, by Dr. Matthew D. Mann, of Buffalo.
25. The Surgical Treatment of Retroversion and Prolapse of the Uterus, by Dr. Paul F. Mundé, of New York.
26. A Paper, by Dr. Theophilus Parvin, of Philadelphia.
27. Series of One Hundred Laparotomies; My Mistakes and Failures, by Dr. A. Palmer Dudley, of New York.

Adjournment at 1 P. M.

Afternoon session at 2.30 o'clock.

28. Laparotomy in Trendelenburg's Posture, with Exhibition of a New Operating-Table, by Dr. Clement Cleveland, of New York.
29. The Electrical Treatment of Uterine Fibroids in England, by Dr. George Keith, of Brooklyn.
30. Diabetes Mellitus Gravidarum, by Dr. Henry D. Fry, of Washington.
31. A Successful Porro Operation, by Dr. R. Stansbury Sutton, of Pittsburgh, Penn.
32. An Argument against the Stem pessary, or so-called Drain-tube, by Dr. Egbert H. Grandin, of New York.

There will be a lunch at the Arlington Hotel each day after the morning session, for the Fellows and invited guests.

Officers for 1891.—President, A. Reeves Jackson, Chicago. Vice-Presidents, Joseph Taber Johnson, Washingington, William H. Baker, Boston. Secretary, Henry C. Coe, New York. Treasurer, Matthew D. Mann, Buffalo.

Other Members of the Council.—William M. Polk, New York; H. P. C. Wilson, Baltimore; Francis H. Davenport, Boston; E. C. Dudley, Chicago.

The Hotel Arlington will make a deduction to Fellows and Guests of the Society.

HYDRASTIS CANADENSIS FOR NIGHT-SWEATS.—Cruse has used the fluid extract of hydrastis canadensis with very good results in the night-sweats of phthisis. He gives it in doses of thirty minims, and often finds that the dose does not have to be repeated for some time.

Official List of Changes in the Stations and Duties of Officers Serving in the Medical Department, U. S. Army, from August 8, 1891, to August 14, 1891.

Asst. Surgeon John J. Cochran, U. S. A., died at St. Luke's Hospital, New York City, August 5, 1891.

Major Alfred C. Girard, Surgeon U. S. A., relieved from duty at Ft. Niagara, New York, and ordered to Ft. Sheridan, Ill., for duty.

Capt. John O. Skinner, Asst. Surgeon, assigned to duty at Ft. Clark, Texas.

Official List of Changes in the Medical Corps of the U. S. Navy, for the Week Ending August 15, 1891.

P. A. Surgeon J. Baker, detached from U. S. S. "Palos," and authorized to delay reporting in the United States for six months.

P. A. Surgeon J. S. Sayre, detached from the U. S. S. "Ranger," and ordered to the U. S. S. "Palos."

P. A. Surgeon V. C. B. Means, ordered to the New York Naval Hospital, September 1.

Official List of Changes of Stations and Duties of Medical Officers of the U. S. Marine-Hospital Service, for the Three Weeks Ending August 8, 1891.

Surgeon George Purviance, detailed as chairman, Board of Examiners. August 8, 1891.

Surgeon H. W. Sawtelle, to proceed to Portland, Me., for special duty, August 3, 1891.

Surgeon John Godfrey, to represent the Service at Seventh International Congress of Hygiene and Demography. July 25, 1891. Detailed as member Board of Examiners. August 8, 1891.

Surgeon Fairfax Irwin, detailed as recorder Board of Examiners. August 8, 1891.

Surgeon F. W. Mead, granted leave of absence for thirty days. July 30, 1891.

P. A. Surgeon H. R. Carter, granted leave of absence for thirty days. August 8, 1891.

P. A. Surgeon D. Carmichael, granted leave of absence for thirty days. August 3, 1891.

P. A. Surgeon W. J. Pettus, to proceed to Wilmington, N. C., for temporary duty. July 31, 1891.

Asst. Surgeon J. C. Perry, granted leave of absence for twenty-seven days. July 28, 1891.